The Northumberland Line Order

APP-W5-1: Darren Lord – Level crossing closures

NORTHUMBERLAND LINE

PROOF OF EVIDENCE

OF DARREN

LORD

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1 INTRODUCTION

1.1 My name is Darren Lord. I am a Route Level Crossing Manager (RLCM) within the North & East (North area) Route, which is part of the Eastern Region for Network Rail. I have been in my current role since December 2020, but by profession have 35 years' experience working within the railway industry. Before joining Network Rail, I worked for various train operating companies covering roles from conductor to train driver. I then moved to Network Rail in 2010 covering various roles until I was appointed to the Level Crossing Manager's position in November 2012. My roles and responsibilities during this employment were to conduct maintenance activities, risk assessments on level crossings alongside managing the enhancement and renewals work, along with other aspects relating to "Off Track" works within the railway industry. My current responsibility, so far as is relevant to this public inquiry, is the day-to-day management of seven Level Crossing Managers (LCMs) on the North & East (North) route which is part of Eastern Region.

1.2 The North & East (North) route is split into seven geographical areas, with each Level Crossing Manager having responsibility for risk assessment and asset inspections, liaison with local authorities, internal and external stakeholders along with a multitude of other duties relating to the management of level crossing operation and maintenance. The role of LCM was introduced in 2012 with an intensive 30-day training course covering risk management and assessment using ALCRM (All Level Crossing Risk Model), interaction with level crossing users and stakeholders, asset management and inspections. This was then followed by four weeks of mentorship from various relevant internal disciplines and a final competency assessment. The LCMs then have a competency assessment every 2 years

1.3 Previously, the activity of assessing level crossing risk was split between the Operational Risk Control Coordinator and the Mobile Operations Manager. This fragmented approach meant the Operations Risk Control Coordinators held responsibility for the risk assessments but had often never visited the crossings. The current LCM structure allows for one individual to have responsibility for assessing risk and overseeing the maintenance of their specified crossings, and that all components of the risk assessment are conducted by the person who has personal knowledge of the operation, and particular features of the level crossing.

1.4 I supervise and am accountable for the activities carried out by the LCMs along the North & East (North) route which include monitoring and supervision of the compliance level crossing assets to ensure the risk at level crossings is kept as low as reasonably practicable and that the crossings are maintained to our prescribed maintenance regime.

2 SCOPE OF EVIDENCE

2.1 In this proof of evidence, I explain how the LCMs conduct the risk assessment in respect of a crossing for which they are responsible, and their general maintenance responsibilities. I then set out the particular risk information for the crossings.

3 ABBREVIATIONS

ORR	Office of Rail and Road
LCM	Level Crossing Manager
RLCM	Route Level Crossing Manager
ALCRM	All Level Crossing Risk Model
FPW	Footpath with wicket gates
FPGT	Footpath with Bridleway gates and telephones
FWI	Fatality Weighted Injuries/Index- method to work out safety performance
MSL	Miniature Stop Lights
WB	Whistle boards
HMRI	Her Majesty Railway Inspectorate
NRA	Narrative Risk Assessment

4 RISK ASSESSMENT

4.1 Network Rail has a responsibility and legal duty under the Health and Safety at Work Act 1974 for the health, safety, and welfare of the general public and of its employees.

4.2 Network Rail also has a legal responsibility under the Management of Health and Safety at Work Regulations 1999. Section 3 focuses on the requirement for suitable and sufficient assessments of risk to health and safety of employees and others in connection with their undertaking.

4.3 Network Rail has identified that one of the greatest public risks on the railway arises in conjunction with the use of level crossings. This is the location at which the live railway has a direct interface with other movements (e.g.: Pedestrians, vehicles and/or horse riders). Network Rail is continuing to work to eliminate such risk or to reduce it as much as is reasonably practicable.

4.4 There are three aspects to a risk assessment which are carried out in respect of each level crossing: namely:

i. On site data collection;
ii. ALCRM (Quantitative assessment); and
iii. Narrative Risk Assessment ("NRA").

4.5 LCMs undertake all the above risk assessment processes, which ultimately lead to an optioneering exercise, to consider how risk at an individual crossing can be eliminated, mitigated, or managed by the options submitted, and any recommendations which may be made to the route's Chief Operating Officer as to which options are to be actioned.

4.6 I discuss each of these risk assessment processes below from a practical perspective – that is, the involvement of the LCMs conducting those assessments. I do not discuss how those risk assessment tools have been developed, or how they are regarded within the industry as they are tools endorsed by our regulatory bodies.

4.7 The LCM must carry out a risk assessment every 1.25 years at the highest risk crossings, every 2.25 years at the medium risk crossings and every 3.25 years at the lower risk crossings. M13 crossing are closed crossings, they are not risk assessed but are monitored and if usage is identified a risk assessment would then be carried out.

Category	Criteria	Assessment Frequency (Years)
Red	• Individual risk is A • Collective risk is 1 • Collective risk is 2 • Collision frequency (pedestrian + vehicle) is > 0.01	1.25
Yellow	• Individual risk is B • Individual risk is C • Collective risk is 3 • Collision frequency (pedestrian + vehicle) is > 0.001 • Sighting time is less than warning time by > 4 seconds **Note:** This does not take mitigations such as whistle boards and telephones into account	2.25
Double Yellow	Risk score is not M13 and no red or yellow criteria apply	3.25
Green	Risk score is M13	Not assessed

TABLE 1 RISK ASSESSMENT FREQUENCY CRITERIA

4.8 There is also a requirement to carry out a new risk assessment if there are either three reports of poor user behaviour within twelve months, one occasion requiring a train driver to apply an emergency brake due to a person being on the crossing, or an accidental fatality, a "triggered" risk assessment is undertaken within four weeks[1] of the event or the last event where three reports of poor user behaviour triggers the risk assessment.

4.9 There is also a further requirement to carry out a new risk assessment if there is a planned increase to the train timetable or a requirement to run longer trains. Additionally, any changes to the layout of the crossing or usage over the crossing would require a new assessment to be completed. Any of these may result in a change to the risk score and fatality and weighted injuries (FWI).

5 ALCRM

5.1 To calculate the level of risk for each level crossing, ALCRM requires specific information about each level crossing asset to be inputted in order for the 'risk score' and 'FWI' to be calculated.

5.2 LCMs are responsible for collecting and consolidating the following information to ALCRM and contacting any authorised users and stakeholders, inviting them to participate in the assessment.

5.3 Firstly, information on the crossing is gathered from existing records held by Network Rail; most importantly from historic risk assessments, and incident data (i.e. any 'near-miss' or deliberate misuse incidents), and from stakeholder engagement (primarily, with users of the crossing).

5.4 Secondly, an important aspect of the information gathering exercise is the site visit completed by the LCM. The site visit will provide the following information for input into the ALCRM model:

i. The type of crossing surface or deck and its configuration. Different types of crossing surface have different non-slip properties.

1 As per NR/L3/XNG/308

ii. The distance from the decision point[2] to the nearest rail and also the distance from the decision point to 2 metres beyond the furthest rail. These measurements are vitally important to calculating the traverse time and thus the required sighting distance.

iii. Whether the signs are positioned so that they are clearly visible to a crossing user as they approach the crossing.

iv. Sighting distances measured in all directions from both sides of the track. The distance measured from the decision point to where a train is first visible to a crossing user as it approaches the level crossing.

v. Whether there are any obstructions that make it difficult to see an approaching train.

vi. Any adjacent sources of light or noise which could affect the user's ability to see or hear an approaching train

vii. Whether a second train passes the crossings within 20 seconds of the first and if the second train would be visible to a crossing user.

viii. The orientation and layout of the crossing is used to assess sun glare risk, where either approaching trains and or warning equipment could be masked by bright or low sunshine.

ix. Whether there is anything that can be done to improve sighting.

x. Whether there are any whistle boards providing additional warning at the crossing.

xi. Whether there are any new or planned developments in the area. New residential or retail/business developments can increase or even decrease the level of use over a crossing.

5.5 Photographs are taken of all the crossing's approaches, road and railway signage plus crossing equipment and rail approaches. These will give a true and accurate representation of how the crossing looked on the day of the data collection. All photographs are then stored in the level crossing files.

2 A decision point is the last point of safety, where an individual would stand and make an informed decision whether or not it is safe to cross, the CC03 - Stop Look Listen sign is usually positioned at this point

6 MEASURING SIGHTLINES

6.1 The figure below is a typical layout of a crossing to help explain the terminology used to assess sighting distances.

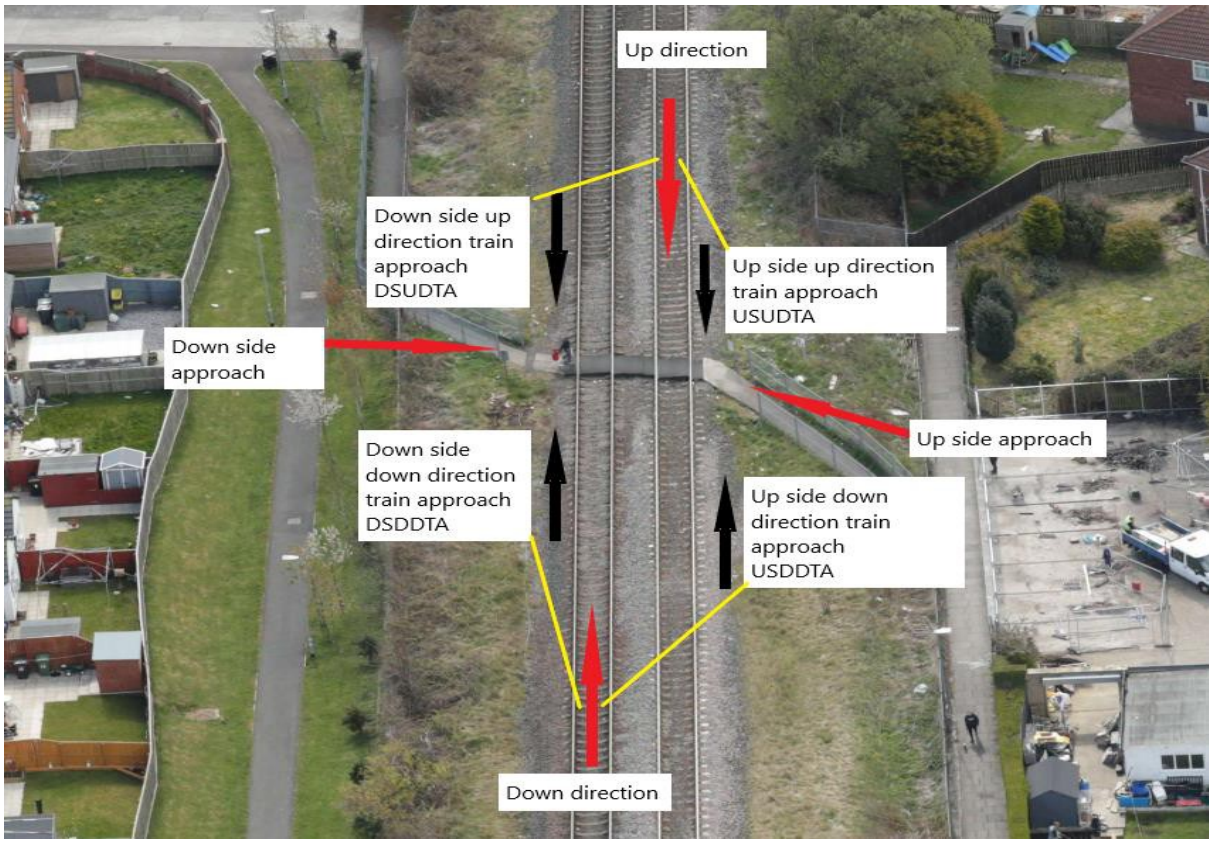


FIGURE 1 TYPICAL LAYOUT OF A LEVEL CROSSING

6.2 The time available to a user of the crossing to see an approaching train and to cross safely is dependent on the speed of the train and traverse distance of the crossing.

6.3 The required sighting distance is calculated by multiplying the time taken to cross the railway safely by the line speed for the section of line at issue.

6.4 The first step is to calculate the required time to traverse the crossing safely. This is done by dividing traverse distance by the average walking pace (1.18 metres per second). The traverse distance is the distance measured from the decision point (see para 5.4(ii) above) to a point 2 metres from the line on the opposite side of the railway. e.g., the traverse time for a traverse distance of 9 metres would be calculated as 9 metres ÷ 1.18 metres per second = 7.57 seconds. This gives the average time a user would take to walk from one position of safety to another (i.e. from the 'decision point' to a point 2 m from the track at the other side of the crossing).

6.5 The traverse time is then multiplied by the maximum line speed (converted from miles per hour to metres per second) to give the required sighting distance. e.g. 7.57 seconds x 31.29 metres per second (70mph) = 236.86 metres

6.6 Variations to the above calculation are used when vulnerable persons are known to use the crossing, in which case an additional 50% is added to the traverse time, and where no crossing deck exists, users are therefore required to walk on the ballast and step over rails, a walking speed of 0.914 metres per second is used, rather than 1.18 metres per second. Where steps

are within the decision point or the crossing is skewed to the tracks the LCM can adjust the traverse time as they see fit.

6.7 The LCMs are provided with a calculator within an Excel spreadsheet to assist and remove the possibility of errors when calculating required sighting distances.

6.8 The LCM measures sighting distances in either direction from both sides of the tracks. Whilst standing at the decision point, a measurement is taken using a range finder to a fixed structure or feature where possible. If no structures or features exist, then the LCM will walk out with a measuring wheel to the distance where the CC03 - Stop Look Listen sign is lastly visible, or where it is known that a train is visible to. Where possible, the visibility of an approaching train is double checked with a range finder to an actual train, although this is not to be relied upon due to the speed or the approaching trains.

6.9 Weather conditions can affect visibility – especially if areas are known to be foggy/misty in the winter months. The LCM would include this information in their NRA. So even if the crossing has suitable sighting, this does not necessarily mean they have sufficient sighting at all times throughout the year.

7 USAGE

7.1 As part of the risk assessment data the LCM will place a covert camera at the crossing for a minimum of 9 days. This provides the LCM with an understanding of when and by whom the crossing is used. The census also highlights potential vulnerable users. However, the census will not give a definitive position as vulnerable users are difficult to capture from a still photograph. The LCM will use their local knowledge from previous visits to the crossing to help get a better understanding.

7.2 The LCM assess the surrounding environment for potential seasonal variation to the sight lines caused by fog or vegetation growth, local attractions, or tourist attractions. If the above were found, the LCM would undertake a second census at the appropriate time to record the increase/decrease in seasonal variations.

7.3 Anything else the LCM believes relevant would be noted on his data collection form and included on the Narrative Risk Assessment, which I refer to further below.

8 RISK ASSESSMENT AND OPTIONEERING

8.1 A defined set of observable crossing features, referred to at para 5.4 above, are recorded and then inputted into ALCRM to obtain a rating/score.

8.2 ALCRM will then provide its rating score, which is divided into two parts: collective risk and individual risk of fatality.

8.3 Collective risk is a measure of the total harm, or safety loss and is expressed in terms of FWI per year. This is reported in a simplified numeric form ranked from ‘1 to 13’. ‘1’ represents the highest risk. ‘13’ represents nil risk. You would only usually see a 13 where the crossing is closed, or it receives no usage.

8.4 The risk to the individual crossing user is presented as risk of fatality to one individual using the crossing regularly for one year. It is expressed as a letter, ranked from ‘A to M’ where ‘A’ represents the highest risk, and ‘M’ represents nil risk. You would only see an ‘M’ where the crossing is closed, or no usage is recorded or observed during an extended census.

8.5 The risk assessment process, and decision making which follows the same, does not stop with the ALCRM score. It would be possible, for example, for two crossings within an LCM’s area of responsibility to both score C4 (a high-risk crossing) but one of those crossings might have

features or characteristics which cause the LCM some concern, whereas the other does not. This would be identified in the Narrative Risk Assessment.

8.6 The NRA is vitally important to the management of level crossings; it gives the LCM the opportunity to describe any concerns they have with each crossing under their control and allows them to differentiate between similar types of crossing with a similar risk score. The LCM will use the NRA to support and justify their decision making and thought process. The NRA includes evidence collected on site during the data collection along with their local knowledge gained from visiting the crossing numerous times throughout the year, and the options considered to make the crossing safer.

8.7 Following completion of the risk assessments, the LCM will carry out an 'optioneering' exercise, to consider options for eliminating, reducing, mitigating, or managing the risk at an individual crossing.

8.8 Options which are considered by the LCM are on a risk control scale:

i. Can we eliminate the risk: This consideration is closure. This option can be achieved by means of diversion, closure via an under or over bridge, and removing the rights to use the crossing. It should be noted as part of this consideration that installing new infrastructure is not always possible due to lack of funding and or lack of physical room to install the new equipment or structures.

ii. Can we control the risk: The next stage on the risk management is if we cannot eliminate the risk, this option would be in the form of technologically engineered solution. For an example whether a fully integrated Red/Green warning lights or a barrier/gate control system can be installed at the level crossing.

8.9 This is not a matter which would be for the LCM to determine – questions of whether such infrastructure could be installed in practice would be for a specialist engineering team, and questions of sourcing funding put forward to sponsors.

8.10 Options which would be considered by the LCM to reduce or mitigate the risk would usually focus on additional technologies or warnings which could be installed at the crossing. This would include, for example, the installation of an active warning system, which would show a red light to instruct a user a train is approaching or a green light to instruct a user it is clear and safe to cross along with audible warnings.

8.11 Options which would be looked at by the LCM to manage the risk would be minor alterations to improve the crossing, such as delivering a gate-to-gate enhancement to ensure users cross the railway on the shortest safest possible route.

8.12 Other more limited options could be actioned by the LCM's themselves and this could for example include such things as arranging an education campaign at the crossing to educate the users how to use the crossing safely and in the most appropriate way, additional visits to carry out maintenance and other minor pieces of work to ensure the crossing remains to the current standard.

8.13 As I indicated above, the decision on whether any particular option should be taken forward does not rest with the LCM. The LCM will make recommendations, based on the NRA at the optioneering meeting. This meeting would be attended by a selection of senior managers and level crossing subject matter experts, who would ultimately make a decision having regard not only to the crossing under discussion but the wider network in the North & East route.

9 MAINTENANCE

9.1 The LCM is responsible for carrying out a maintenance asset inspection. This activity is carried out at least once every 6 months at an unprotected footpath. If the crossing had an automatic warning system installed, its inspection frequency is increased to at least every 7 weeks nationwide but on the North and East route, we elected to have a 6-weekly inspection.

9.2 During the inspection the LCM carries out a visual tactile inspection on the crossing, if there is a minor defect the LCM can safely rectify, they will do it there and then. Anything they cannot complete will be reported to the relevant department with a priority code that is stipulated in the relevant maintenance standard NR/L2/SIG/19608.

9.3 The inspections and works which result from the LCM reporting an issue on site, are in addition to the Maintenance Scheduled Tasks which are in place to maintain the sighting lines of each footpath and user worked crossing. To comply we dictate one visit to cut vegetation and one to spray vegetation to stop the regrowth. This frequency can be adjusted where required.

9.4 In addition, track standards dictate that every level crossing surface needs to be removed and replaced to allow inspection and maintenance of the track at set periods. This costs approximately £5000 on average each time the crossing is removed; each crossing is lifted at least once a year; however, this can be more often depending on the track quality.

9.5 I set out these figures to give an indication of the general maintenance costs associated with each level crossing on an annual basis, but these clearly do not take into account any costs which would be incurred in the event of an incident (for example, if there was a collision between a train and a motor vehicle / pedestrian) or a defect identified by an LCM on a site visit which he was not able to safely rectify himself.

9.6 Any faults an LCM raises for the maintenance teams to undertake creates a work order. It is the LCM's responsibility to monitor these work orders to ensure they have been undertaken within the priority time frame stipulated and to an acceptable standard of repair.

10 BNE /0.34 Dairy (Palmersville) – Narrative Risk Assessment

Eastern Region - North & East route

Level Crossing Risk Assessment

Name of Crossing: Dairy (Palmersville)

Type of crossing: Footpath with wicket gates
Date of NRA: 11th February 2020

Name of crossing	Dairy
Type	Footpath with wicket gates (FPW)
Engineers Line Reference (ELR)	BNE
Mileage	0m 34ch
OS grid reference	NZ287694
Number of lines crossed	Two
Maximum Line speed (mph)	25mph
Electrification	None
Signal box	Tyneside IECC
Risk assessment next due date	12/05/2022
ALCRM Risk Details	
Risk Score	D5
FWI	0.000725575

TABLE 2 OVERVIEW OF CROSSING DETAILS

10.1 As part of a level crossing risk assessment, data is entered into the industry accepted risk modelling support tool (ALCRM) which enables Network Rail to compare risk at all level crossings throughout the network. Results for this level crossing are provided below; see **Appendix A - ALCRM** for further details on how this is calculated.

10.2 Dairy crossing has an ALCRM score of D5 and an FWI of 0.000725575, this is from a risk assessment that was completed on 22nd October 2019. The line speed is 25 mph on both lines.

10.3 Dairy crossing is known as a passive crossing, meaning that users of the level crossing must decide for themselves whether it is safe to cross. The crossing is not controlled, equipped with lights, audible warnings or barriers interlocked with signals. Crossing safely relies entirely on users checking for approaching trains to ensure their personal safety. Users are instructed, at the decision point, 2m from the nearest running rail, by virtue of a sign to Stop Look Listen: Beware of trains. The crossing distance is measured from this decision point, across the railway, to a position of safety 2m beyond the furthest running line.

11 BNE /0.34 Dairy (Palmersville) – Crossing imagery

FIGURE 2 WEST SIDE CROSSING APPROACH

FIGURE 3 EAST SIDE CROSSING APPROACH

FIGURE 4 WEST SIDE ACROSS THE CROSSING

FIGURE 5 EAST SIDE ACROSS THE CROSSING

FIGURE 6 AERIAL VIEW OF DAIRY FOOTPATH CROSSING

FIGURE 7 UP (EAST) SIDE LOOKING TOWARD UP APPROACHING TRAINS

FIGURE 8 UP (WEST) SIDE LOOKING TOWARD DOWN APPROACHING TRAINS

FIGURE 9 DOWN (EAST) SIDE LOOKING TOWARD UP APPROACHING TRAINS

FIGURE 10 DOWN (WEST) SIDE LOOKING TOWARDS DOWN APPROACHING TRAINS

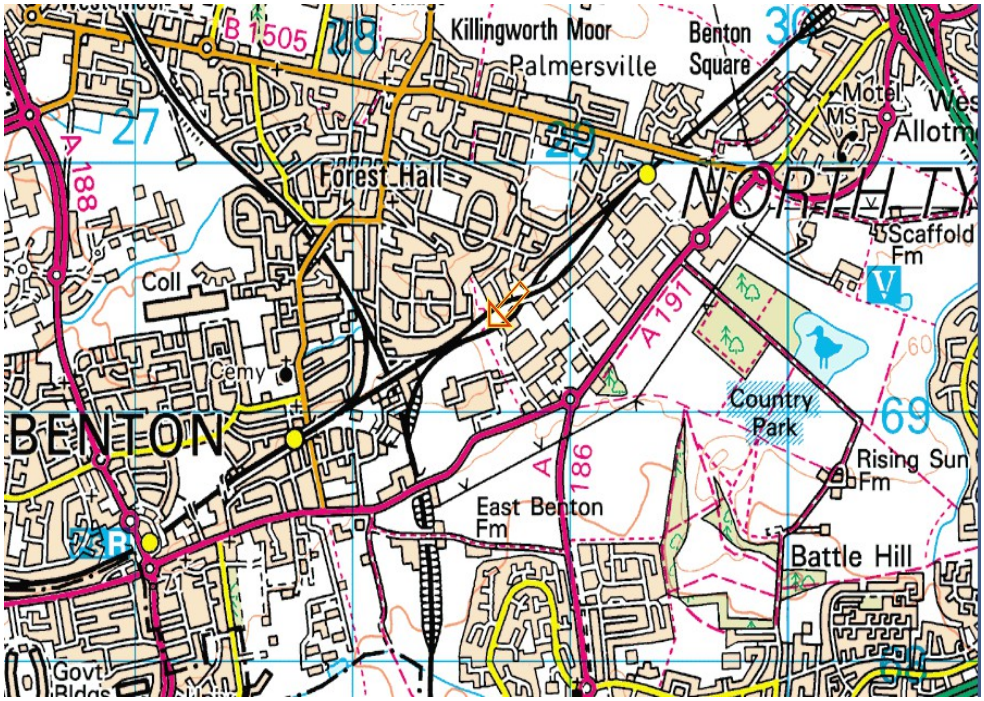


FIGURE 11 ORDNANCE SURVEY MAP VIEW OF DAIRY FOOTPATH CROSSING

12 BNE /0.34 Dairy (Palmersville) – Crossing environment

12.1 The crossing is located close to a large residential estate which is to the north west of the crossing known as the Forest Hall estate between Benton and Killingworth Hall.

12.2 To the south west of the crossing are industrial and retail units and a country park to which the A191 runs through.

12.3 The crossing is a public footpath in a highly populated area to the east side providing a cross community link to west side where an industrial and retail area is located. This crossing is used by workers commuting to work in the industrial area and accessing the retail units.

12.4 In addition to the industrial and retail area there is also a country park on the west side as such the area is popular with dog walkers who also use the crossing

12.5 The crossing is located on the Newbiggin to Newcastle line which currently consists of freight trains. The highest permissible speed is 25mph on both lines.

12.6 Local bus services Arriva North East and Go North East operate to/from Ashington linking to the rest of Northumberland and Newcastle.

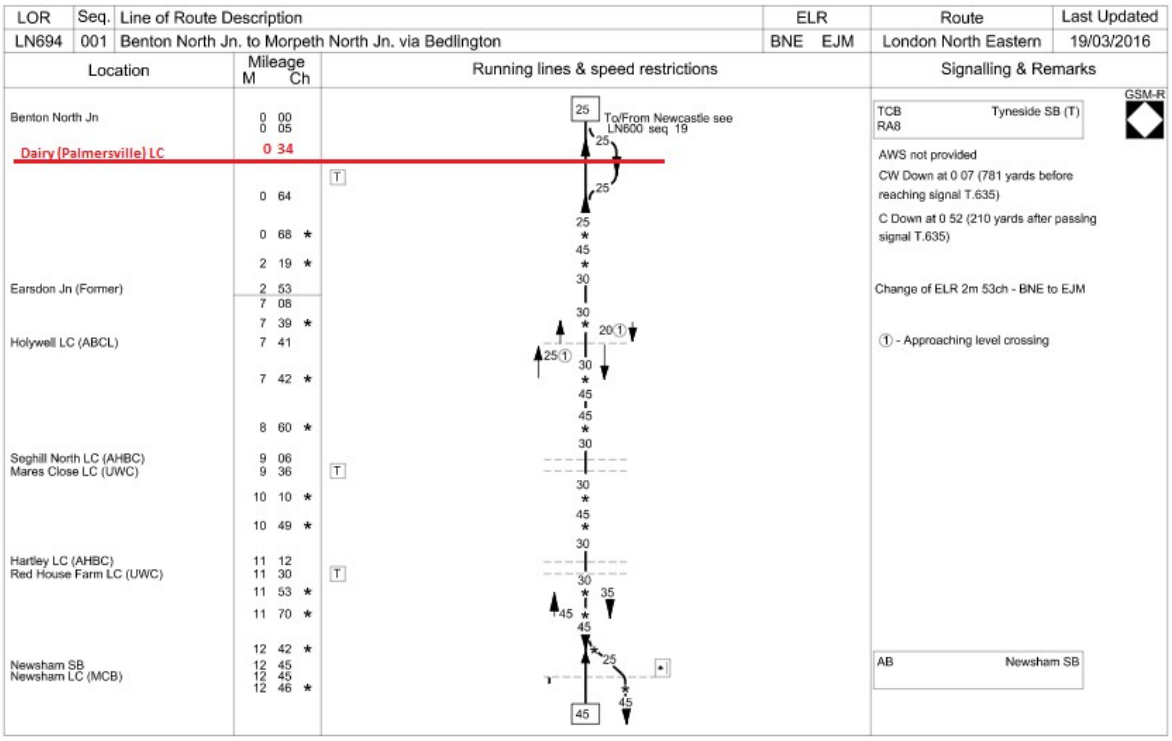


FIGURE 12 LOCATION OF DAIRY CROSSING ON RAILWAY SECTIONAL APPENDIX RAIL MAP

13 BNE /0.34 Dairy (Palmersville) – Train service data

13.1 The current number of timetable trains running over the crossing is 8 per day however both timetabled and non-timetabled freight services can fluctuate daily to meet customer demand, operational requirements, engineering works or during times of disruption. so the number of trains could exceed 8 per day.

13.2 There is currently consultation to increase freight train numbers and open the line up to passenger trains in the near future, which will impact on users of the crossing.

13.3 Risk of trains passing each other in this vicinity is very low due to the number of freight trains. If trains were to pass each other in this vicinity, then the risk would be higher. This means that a train travelling towards the crossing in an opposite direction to another train is temporarily obscured by that train when having just passed over the crossing.

13.4 This gives rise to a real risk of a user of the crossing stepping out immediately after a train has passed and directly into the path of an approaching train from the opposite direction which they have neither seen nor heard.

13.5 Freight trains can be of a length exceeding 200 metres and can easily obscure from sight. There is also a continuing risk that pedestrians do not stop, look and listen for approaching trains when crossing the railway. Users might look but many (if not most) will typically focus their sight in just the one direction and wrongly assume that the crossing is clear when the train approaching from that direction has passed. Users are likely to overlook the possibility that a second train may also be approaching from the opposite direction.

14 BNE /0.34 Dairy (Palmersville) – User Census Data

14.1 Tracsis were commissioned by Network Rail to undertake a census at this crossing. The survey remit required nine consecutive days to be surveyed. The survey was carried out from 21st September to 29th September 2019, inclusive. The survey hours were 00.00 – 24.00 hours daily.

14.2 A total of 535 users passed over the crossing during the nine-day survey.

14.3 The most recent 9-day census was completed between 21st September to 29th September 2019

User Type	Number
Pedestrians	481
Pedal Cyclists	54

14.4 This would also likely include an increase in both vulnerable and encumbered users as well as unaccompanied children, dog walkers (with dogs off-lead) and cyclists.

14.5 Dog walkers are also at particular risk especially in circumstances where either the dog is not kept on a lead and/or the dog runs onto the crossing, which may in turn cause the owner distraction and may result in serious injury or fatality.

ALCRM: ALCRM calculates usage of the crossing to be 481 pedestrians and 54 cyclists per day by reference to data taken in 2019. This would have factored into account the occupation of proximate housing estates on both side of the crossing and school children using the crossing to get to and from school.

15 BNE /0.34 Dairy (Palmersville) – HAZARDS - Sighting and traverse

15.1 A decision point is a position where an individual would reasonably make a decision to cross the railway on the level.

15.2 Sighting is the distance that can be seen in both directions, for approaching trains.

15.3 At the crossing the sighting is compliant for all users traversing the crossing.

15.4 The length of the crossing from one side of the railway to the other side of the crossing is 9 meters when crossing from the up- side and 9 meters when crossing from the downside.

15.5 A whistle-board is provided in the up direction of this crossing only. Whistle-boards instruct train drivers to give an audible warning where sighting of approaching trains is constrained. Although trains driver do not sound their horns during night time quiet period (NTQP) The NTQP refers to the period between 00.00 to 06.00 hours when trains do not sound their horns when passing the whistle board. They will only blow their horns during this period if they see a person at the unlit level crossing. This means the during the NQTP there is no additional protection from the whistle boards and a user's sighting of approaching trains will be further impaired because of the darkness. Should the train approach and the driver uses the horn, there would be insufficient time for a user to reach a point of safety.

15.6 The onus is placed on the train driver to sound a warning which can lead to either no warning being sounded or inconsistent warning times (based on whether the train driver sounds the horn on approach to the board, at the board or beyond the board).

15.7 However, positions of whistle boards must be calculated, and their effectiveness can be significantly reduced by ambient noise such as heavy wind and driving rain, industrial noise or the noise of another passing train.

15.8 The calculation for position of whistle boards is a) length of the crossing, b) speed of trains and c) speed of sound. The maximum position of whistle boards is 400 metres from the crossing, after which they may serve no useful purpose (**Appendix B**: ORR Guidance Document- Level Crossings: A guide for Managers, Designers and Operators. Railway Safety Publication (RSP) 7 – December 2011).

15.9 The whistle-board at this crossing is situated at 179 metres away from the crossing on the up line. The traverse time is 11.35 seconds, which means that the WB on up line gives adequate warning time as shown in 6.10. The traverse time has been increased by 50% due to the large number of vulnerable users i.e.: school children.

15.10 Whistle board information

	Line speed (mph)	Whistle board distance (m)	Whistle board warning time (secs)	Is the train horn clearly audible at the crossing?	Is the whistle board warning effective?	Comments on audibility and whistle board position
Up line (from Ashington to Newcastle)	25	179	15.5	Yes	Yes	The position of the whistle board does give satisfactory warning to users of the crossing during daylight hours.

15.11 The crossing has rubber decking and is considered wide enough for all users of the crossing. It is fitted with a non-slip surface.

15.12 The traverse times are calculated as:

	Traverse time (s)
Pedestrians	8

15.13 Traverse time has been calculated using Network Rail sighting calculation standard are based on traverse crossing speed of 1.189m/s and a traverse of 9 metres for a vulnerable user. 50% has been added due to school children from the nearby schools using the crossing on a daily basis.

15.14 Sighting was measured by use of a range finder. A rangefinder is a device that measures distance from the observer to a target, in a process called ranging.

All distances are recorded in metres	Minimum sighting distance required	Measured sighting distance	Sighting distance measured to	Is sighting compliant?	If deficient, is sighting distance mitigated?	Notes on deficient sighting time mitigations
Up side looking toward up direction train approach	127	231	Vegetation	Yes	N/A	N/A
Up side looking toward down direction train approach	127	235	Vegetation	Yes	N/A	N/A
Down side looking toward up direction train approach	127	145	Vegetation	Yes	N/A	N/A
Down side looking toward down direction train approach	127	250	Vegetation	Yes	N/A	N/A

15.15 Sighting restrictions are recorded as follows:

	Up Direction	Down Direction
Nothing; vanishing point	NO	NO
Track curvature	YES	YES
Permanent structure (building/wall etc)	NO	NO
Signage or crossing equipment	NO	NO
Vegetation	NO	NO
Bad weather on the day of visit	NO	NO
Other	NO	NO

15.16 There are no known obstructions that could make it difficult for users to see approaching trains. There are no known issues with foliage, fog or other issues that might impair visibility of the crossing, crossing equipment or approaching trains.

16 BNE /0.34 Dairy (Palmersville) – Identified hazards, risks and mitigations

Hazard	Potential risk	Mitigations
Trains	Fatality or serious injury	• Instructional signage • Adequate sighting distance is provided • Whistle board installed
Slip, trip, falls, (uneven crossing surface)	Fatality or serious injury	• Appropriate crossing decking for crossing type and location • Crossing inspections and maintenance regime • Vegetation management plan
Impediment to hearing approaching trains (due to inclement weather)	Fatality or serious injury	• Level crossing signage • Vegetation management plan • Train warning given
Darkness	Fatality or serious injury	• Review of night time usage, completed
Vegetation growth between visits: impediment to sighting trains approaching crossing	Fatality or serious injury	• Vegetation management plan • Crossing inspections and maintenance regime
Unfamiliar users	Fatality or serious injury	• Regulatory Instructional signage at crossing
Increased usage due to any future developments	Fatality or serious injury	• Review and update to risk assessment

17 BNE /0.34 Dairy (Palmersville) – ALCRM CALCULATED RISK

17.1 Results for this level crossing are provided below; see **Appendix A** - ALCRM for further details on how this is calculated.

Safety risk				
Compared to other crossings the safety risk for this crossing is	**Individual risk**		**Collective risk**	
	D		**5**	
	Individual risk (fraction)	**Individual risk (numeric)**		
Van / small lorries	0	0	0	
HGV	0	0	0	
Bus	0	0	0	
Tractor / farm vehicle	0	0	0	
Cyclist / Motor cyclist	1 in 84990	0.000011766	0.000120245	
Pedestrian	1 in 84990	0.000011766	0.000601226	
				Derailment contribution
Passengers			0	0
Staff			0.000004104	0
Total			0.000725575	0
Collision frequencies	**Train / user**	**equipment**	**Other**	
Vehicle	0	0	0	
Pedestrian	0.000837472	0.000736501	0.002017433	
Collision risk	**Train / user**	**User equipment**	**Other**	
Vehicle	0	0	0	
Pedestrian	0.000666427	0.000011548	0.000043496	

17.2 At present, there are 2697 level crossings on the Eastern Region. Out of this figure Dairy crossing is ranked number 822. However, if you compare this level crossing to other crossings of a similar type it is ranked 153 out of 878. These figures are subject to change but were correct on 19 January 2021.

17.3 At present, there are 6443 level crossings in the country. Out of this figure Dairy crossing is ranked number 1616. However, if you compare this level crossing to other crossings of a similar type it is ranked 366 out of 2412. These figures are subject to change but were correct on 19 January 2021.

18 BNE /0.34 Dairy (Palmersville) – SAFETY MANAGEMENT INFORMATION SYSTEM

18.1 Network Rail's internal safety management information systems (SMIS) disclose that during the period of the previous 4 years, there were no reported incidents at the crossing. This does not mean that there has been no misuse of the crossing within this period. However, there is no recordable CCTV, which would have proven to the contrary.

19 BNE /0.34 Dairy (Palmersville) – Options Evaluated

19.1 Detailed below are a series of options in terms of either removing or mitigating the risk to crossing users. The outline comments below show how these options have been considered.

Option	Term[1]	ALCRM risk score	ALCRM FWI	Safety Benefit	Comments
Close crossing by grade separated alternative	Long Term	M13	0.0	7.25E-4	Closure of this crossing is possible via:- • a grade separated alternative such as a bridge or underpass. • diversion of right of way
Installation of Red & Green miniature stop light warning system (MSL)	Long Term	E6	2.56E-4	4.69E-4	Upgrade to miniature stop light warning system would be a considered safety improvement as it would give users warning of an approaching train instead of looking out for trains. The system would also mitigate for inclement periods of weather that would reduce the sighting of approaching trains.
improve access approaches	Medium Term	D5	7.10E-4	0.15E-4	The option will be considered as part of the project to introduce a passenger service on this route.
Educational Campaigns	Short / Mid Term	N/A	N/A	N/A	Educational campaigns using modern methods can be an effective tool to raise public awareness of the hazards and encourage safe and responsible behaviours at crossings. This in turn would help to reduce the risks of incidents and misuse. Awareness campaigns though do tend to have limited effectiveness on the public as they are easily forgotten shortly after.

20 BNE /0.34 Dairy (Palmersville) – Northumberland Line Project Review

20.1 Project Overview

20.1.1 The project is proposing an increase in the number of trains to 66 passenger trains, 1 empty coaching stock train and 20 freight trains per day and a revised change of the line speed to 25 mph on the Up line and 25 mph on the down line[3], includes changes to the crossing environment within 700 metre of the crossing, such as new stations and track layouts.

20.2 Amended Train Services

20.2.1 The proposed number of timetable trains running over the crossing is 87 per day however both timetabled and non-timetabled freight services can fluctuate daily to meet customer demand, operational requirements, engineering works or during times of disruption; so, the number of trains could exceed 87 per day

20.3 Amended User Census Data

20.3.1 The proposal does not affect the user census.

20.4 Amended Hazards: Sighting and traverse

20.4.1 The proposal does not change the line speed so there aren't any changes to the sighting and traverse details.

20.5 Projected ALCRM Calculated Risk

20.5.1 The new calculated ALCRM Risk Score for Dairy is: -

Proposal ALCRM risk score	
Individual risk	C
Collective risk	3
FWI	0.006616498
Safety Benefit FWI	-0.005709530
Safety Benefit percentage	-629.52%

20.5.2 At present, there are 2697 level crossings on the Eastern Region. This proposal will change the rank of Dairy crossing to 235 on the Region. When you compare this level crossing to other crossings of a similar type will now be ranked 33 out of 878. These figures are subject to change but were correct on 19 January 2021.

20.5.3 At present, there are 6443 level crossings in the country. This proposal will change the rank of Dairy crossing to 434 in the country. When you compare this level crossing to other crossings of a similar type it will now be ranked 68 out of 2412. These figures are subject to change but were correct on 19 January 2021.

[3] Email from M Kitching dated 27 January 2021

20.6 Options Evaluated for the project

20.6.1 The options evaluated to mitigate the increased risks at Hospital Crossing include:

Option	ALCRM Risk Score	ALCRM FWI	Safety Benefit FWI	Safety Benefit percentage	Estimated Cost[4]	Benefit Cost Ratio
Closure	M13	0.000000000	0.006616498	100.00%	£2,040,000.00	0.13
Install MSL (overlay)	D4	0.003064775	0.003551723	53.68%	£150,000.00	0.53
Install MSL (Integrated)	D4	0.003064775	0.003551723	53.68%	£450,000.00	0.18
No Further Mitigation	C3	0.006616498	0.000000000	0.00%	N/A	N/A

CBA gives an indication of overall business benefit. It is used to support, not override, structured expert judgement when deciding which option(s) to progress. The following CBA criteria are used as a support to decision making:

a. benefit to cost ratio is ≥ 1: positive safety and business benefit established;

b. benefit to cost ratio is between 0.99 and 0.5: reasonable safety and business benefit established where costs are not grossly disproportionate against the safety benefit; and

c. benefit to cost ratio is between 0.49 and 0.0: weak safety and business benefit established.

20.7 Conclusion and Recommendation

20.7.1 The proposed increase in trains moves this crossing in to the high risk category due to this increase in risk closure of the crossing is supported.

[4] Costs Supplied at a meeting held on 28th February 2021 between Network Rail & Kilborn Consulting

21 BWC/2.50 Hospital – Narrative Risk Assessment

Eastern Region - North & East route

Level Crossing Risk Assessment

Name of Crossing: Hospital

Type of crossing: Footpath with wicket gates
Date of NRA: 22nd October 2019

Name of crossing	Hospital
Type	Footpath (FPW)
Engineers Line Reference (ELR)	BWC
Mileage	2m 50ch
OS grid reference	NZ274875
Number of lines crossed	Two
Maximum Line speed (mph)	25mph Up 40mph Down
Electrification	None
Signal box	Marcheys House
Risk assessment next due date	22/01/2022
ALCRM Risk Details	
Risk Score	D5
FWI	0.000934329

TABLE 3 OVERVIEW OF CROSSING DETAILS

21.1 As part of a level crossing risk assessment, data is entered into the industry accepted risk modelling support tool (ALCRM) which enables Network Rail to compare risk at all level crossings throughout the network. Results for this level crossing are provided below; see **Appendix A** - ALCRM for further details on how this is calculated.

21.2 Hospital crossing has an ALCRM score of D5 and an FWI of 0.000934329, this is from a risk assessment that was completed on 22nd October 2019. The line speed is 25 mph on the up line and 40 mph on the down line.

21.3 Hospital crossing is known as a passive crossing, meaning that users of the level crossing must decide for themselves whether it is safe to cross. The crossing is not controlled, equipped with lights, audible warnings or barriers interlocked with signals. Crossing safely relies entirely on users checking for approaching trains to ensure their personal safety. Users are instructed, at the decision point, 2 metres from the nearest running rail, by virtue of a sign to Stop Look Listen: Beware of trains. The crossing distance is measured from this decision point, across the railway, to a position of safety 2 metres beyond the furthest running line.

22 BWC/2.50 Hospital – Crossing imagery

FIGURE 13 WEST SIDE CROSSING APPROACH

FIGURE 14 EAST SIDE CROSSING APPROACH

FIGURE 15 WEST SIDE ACROSS THE CROSSING

FIGURE 16 EAST SIDE ACROSS THE CROSSING

FIGURE 17 AERIAL VIEW OF HOSPITAL FOOTPATH CROSSING

FIGURE 18 UP (EAST) SIDE LOOKING TOWARD UP APPROACHING TRAINS

FIGURE 19 UP (DOWN) SIDE LOOKING TOWARD DOWN APPROACHING TRAINS

FIGURE 20 DOWN (EAST) SIDE LOOKING TOWARD UP APPROACHING TRAINS

FIGURE 21 DOWN (WEST) SIDE LOOKING TOWARDS DOWN APPROACHING TRAINS

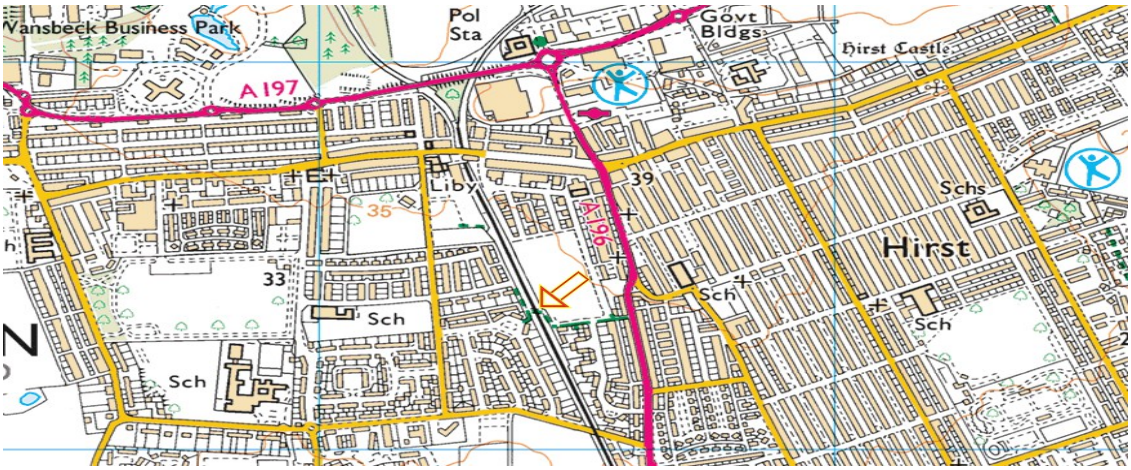


FIGURE 22 ORDNANCE SURVEY MAP VIEW OF HOSPITAL FOOTPATH CROSSING

23 BWC/2.50 Hospital – Crossing Environment

23.1 Ashington is a town and civil parish in Northumberland, with a population in 2011 of 27,864. It was once a centre of the coal mining industry. The town is 15 miles (24 km) north of Newcastle upon Tyne, west of the A189 and bordered to the south by the River Weisbeck. The North Sea coast at Newbiggin-by-the-Sea is 3 miles (5 km) away.

23.2 Ashington is well served by roads. The A189 (Spine Road) to the east of Ashington runs south via Blyth and North Tyneside to Newcastle, and via the A19 Tyne Tunnel to South Tyneside and the A1(M). The A189 also runs north along the coast to Alnwick and Berwick. The A196 runs west towards Morpeth and the A1 which goes north to Scotland and Edinburgh or south to the A1(M) near Newcastle on towards Durham and Yorkshire and the South.

23.3 The nearest mainline railway station is Pegswood on the East Coast Main Line, about 3 miles from the town centre. Local services from here go to Newcastle, Cramlington, Morpeth, and Alnmouth.

23.4 The crossing is a public footpath in a highly populated area, which connects between two large residential areas. There are three schools in the nearby area of the crossing.

23.5 School children are known to use this route. Ashington Central Primary school is 275 metres from the crossing on the upside, which consists of two separate sites. Hirst Park Middle School and St Benedicts RC Middle School are also within 1500 metres of the crossing on the upside. There is also Ashington Academy approximately 450 meters from the crossing and The Dales, which is approximately 380 meters away, both are situated on the west side of the crossing.

23.6 Leisure facilities are also situated on the west side of the crossing and are approximately within 350 meters of the crossing.

23.7 The crossing is located on the Newbiggin to Newcastle line which currently consists of freight trains. The highest permissible speed is 25mph on the up-direction line (northbound) and 40mph which is on the down direction (southbound).

23.8 Local bus services Arriva North East and Go North East operate from Ashington linking to the rest of Northumberland and Newcastle. National Express services also arrive and depart from the bus station.

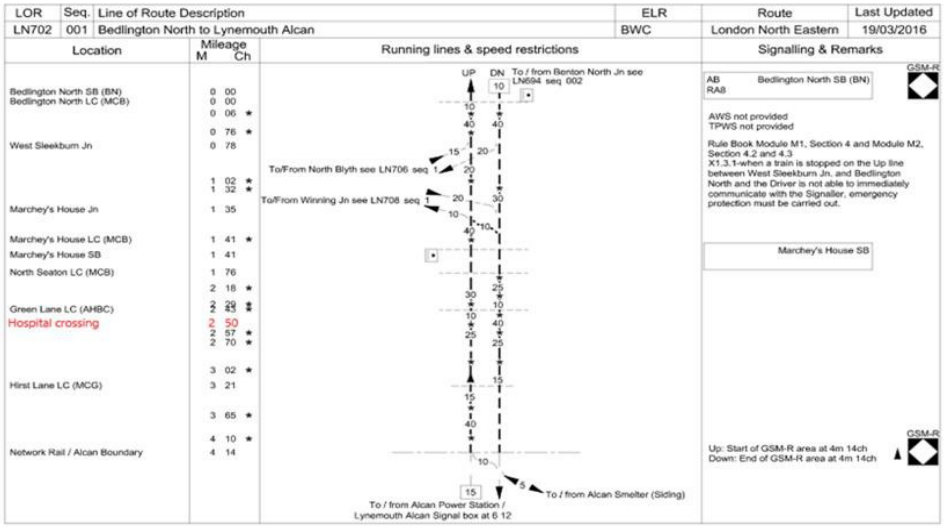


FIGURE 23 LOCATION OF HOSPITAL CROSSING ON RAILWAY SECTIONAL APPENDIX RAIL MAP

24 BWC/2.50 Hospital – Train Service Data

24.1 The current number of timetabled trains running over the crossing is 8 per day. However, both timetabled and non-timetabled freight services can fluctuate daily to meet customer demand, operational requirements, engineering works or during times of disruption. The number of trains could, therefore, exceed 8 per day.

24.2 There is currently consultation to increase freight train numbers and the Northumberland Line Order proposals will open the line up to passenger trains in the near future, which will impact on users of the crossing.

24.3 Risk of trains passing each other in this vicinity is very low due to the number of freight trains. If trains were to pass each other in this vicinity, then the risk would be higher. This means that a train travelling towards the crossing in an opposite direction to another train is temporarily obscured by that train when having just passed over the crossing.

24.4 This gives rise to a real risk of a user of the crossing stepping out immediately after a train has passed and directly into the path of an approaching train from the opposite direction which they have neither seen nor heard.

24.5 Freight trains can be of a length exceeding 200 meters and can easily obscure from sight another train as discussed above. There is also a continuing risk that pedestrians do not stop, look and listen for approaching trains when crossing the railway. Users might look but many (if not most) will typically focus their sight in just the one direction and wrongly assume that the crossing is clear when the train approaching from that direction has passed. Users are likely to overlook the possibility that a second train may also be approaching from the opposite direction.

25 BWC/2.50 Hospital – User Census Data

25.1 Tracsis were commissioned by Network Rail to undertake a census at this crossing. The survey remit required nine consecutive days to be surveyed. The survey was carried out from 21st September to 29th September 2019, inclusive. The survey hours were 00.00 – 24.00 hours daily.

25.2 The data from the census recorded a total of 3,989 users passing over the crossing during the nine-day survey.

25.3 Below shows the calculated seven day daily average of users passing over the crossing

User Type	Number
Pedestrians	481
Pedal Cyclists	54

25.4 This would also likely include an increase in both vulnerable and encumbered users as well as unaccompanied children, dog walkers (with dogs off-lead) and cyclists.

25.5 Dog walkers are also at particular risk especially in circumstances where either the dog is not kept on a lead and/or the dog runs onto the crossing, which may in turn cause the owner distraction and may result in serious injury or fatality.

ALCRM: ALCRM calculates usage of the crossing to be 481 pedestrians and 54 cyclists per day by reference to data taken in 2019. This would have factored into account the occupation of proximate housing estates on both side of the crossing and school children using the crossing to get to and from school.

26 BWC/2.50 Hospital – HAZARDS – Sighting and Traverse

26.1 A decision point is a position where an individual would reasonably make a decision to cross the railway on the level.

26.2 Sighting is the distance that can be seen in both directions, for approaching trains. At the crossing the sighting is compliant for all users traversing the crossing.

26.3 The length of the crossing from one side of the railway to the other side of the crossing is 9 meters when crossing from the up-side and 9 meters when crossing from the downside.

26.4 A whistle-board is provided in the up direction of this crossing only. Whistle-boards instruct train drivers to give an audible warning where sighting of approaching trains is constrained. Although train driver do not sound their horns during night time quiet period (NTQP) The NTQP refers to the period between 00.00 to 06.00 hours when trains do not sound their horns when passing the whistle board. They will only blow their horns during this period if they see a person at the unlit level crossing. This means the during the NQTP there is no additional protection from the whistle boards and a user's sighting of approaching trains will be further impaired because of the darkness. Should the train approach and the driver uses the horn, there would be insufficient time for a user to reach a point of safety.

26.5 The onus is placed on the train driver to sound a warning which can lead to either no warning being sounded or inconsistent warning times (based on whether the train driver sounds the horn on approach to the board, at the board or beyond the board).

26.6 However, positions of whistle boards must be calculated, and their effectiveness can be significantly reduced by ambient noise such as heavy wind and driving rain, industrial noise or the noise of another passing train.

26.7 The calculation for position of whistle boards is a) length of the crossing, b) speed of trains and c) speed of sound. The maximum position of whistle boards is 400 metres from the crossing, after which they may serve no useful purpose (**Appendix B:** ORR Guidance Document- Level Crossings: A guide for Managers, Designers and Operators. Railway Safety Publication (RSP) 7 – December 2011).

26.8 The whistle-board at this crossing is situated at 179 metres away from the crossing on the up line. The traverse time is 11.35 seconds, which means that the WB on up line gives adequate warning time as shown in 15.10. The traverse time has been increased by 50% due to the large number of vulnerable users i.e., school children.

26.9 Whistle board information

	Line speed (mph)	Whistle board distance (m)	Whistle board warning time (secs)	Is the train horn clearly audible at the crossing?	Is the whistle board warning effective?	Comments on audibility and whistle board position
Up line (from Ashington to Newcastle)	25	179	15.5	Yes	Yes	The position of the whistle board does give satisfactory warning to users of the crossing during daylight hours.

26.10 The crossing has rubber decking and is considered wide enough for all users of the crossing. It is fitted with a non-slip surface.

26.11 The traverse times are calculated as:

	Traverse time (s)
Pedestrians	11.35

26.12 Traverse time has been calculated using Network Rail sighting calculation standard these are based on a traverse crossing speed of 1.189m/s and a traverse of 9 metres for a vulnerable user. 50% has been added due to school children from the nearby schools using the crossing on a daily basis.

26.13 Sighting was measured by use of a range finder. A rangefinder is a device that measures distance from the observer to a target, in a process called ranging.

All distances are recorded in metres	Minimum sighting distance required	Measured sighting distance	Sighting distance measured to	Is sighting compliant?	If deficient, is sighting distance mitigated?	Notes on deficient sighting time mitigations
Up side looking toward up direction train approach	127	400	Bridge over old station before curvature of the track	Yes	N/A	N/A
Up side looking toward down direction train approach	203	522	Rear of train moving away from the crossing	Yes	N/A	N/A
Down side looking toward up direction train approach	127	407	Bridge over old station before curvature of the track	Yes	N/A	N/A
Down side looking toward down direction train approach	203	615	Rear of train moving away from the crossing	Yes	N/A	N/A

26.14 Sighting restrictions are recorded as follows:

	Up Direction	Down Direction
Nothing; vanishing point	NO	NO
Track curvature	YES	YES
Permanent structure (building/wall etc.)	NO	NO
Signage or crossing equipment	NO	NO
Vegetation	NO	NO
Bad weather on the day of visit	NO	NO
Other	NO	NO

26.15 There are no known obstructions that could make it difficult for users to see approaching trains. There are no known issues with foliage, fog or other issues that might impair visibility of the crossing, crossing equipment or approaching trains.

27 BWC/2.50 Hospital – Identified Hazards, Risks and Mitigations

Hazard	Potential risk	Mitigations
Trains	Fatality or serious injury	• Instructional signage • Adequate sighting distance is provided • Whistle board installed
Slip, trip, falls, (uneven crossing surface)	Fatality or serious injury	• Appropriate crossing decking for crossing type and location • Crossing inspections and maintenance regime • Vegetation management plan
Impediment to hearing approaching trains (due to inclement weather)	Fatality or serious injury	• Level crossing signage • Vegetation management plan • Train warning given
Darkness	Fatality or serious injury	• Review of night time usage, completed
Vegetation growth between visits: impediment to sighting trains approaching crossing	Fatality or serious injury	• Vegetation management plan • Crossing inspections and maintenance regime
Unfamiliar users	Fatality or serious injury	• Regulatory Instructional signage at crossing
Increased usage due to any future developments	Fatality or serious injury	• Review and update to risk assessment

28 BWC/2.50 Hospital – ALCRM CALCULATED RISK

28.1 Results for this level crossing are provided below; see **Appendix A** - ALCRM for further details on how this is calculated.

Safety risk				
Compared to other crossings the safety risk for this crossing is	**Individual risk**		**Collective risk**	
	D		**5**	
	Individual risk (fraction)	**Individual risk (numeric)**		
Van / small lorries	0	0	0	
HGV	0	0	0	
Bus	0	0	0	
Tractor / farm vehicle	0	0	0	
Cyclist / Motor cyclist	1 in 86430	0.00001157	0.000084459	
Pedestrian	1 in 86430	0.00001157	0.000844593	
				Derailment contribution
Passengers			0	0
Staff			0.000005277	0
Total			0.000934329	0
frequencies	**Train / user**	**equipment**	**Other**	
Vehicle	0	0	0	
Pedestrian	0.00107692	0.000964465	0.002641877	
Collision risk	**Train / user**	**User equipment**	**Other**	
Vehicle	0	0	0	
Pedestrian	0.00085697	0.000015123	0.000056959	

28.2 At present, there are 2697 level crossings on the Eastern Region. Out of this figure Hospital Crossing is ranked number 305. However, if you compare this level crossing to other crossings of a similar type it is ranked 46 out of 878. These figures are subject to change but were correct on 19 January 2021.

28.3 At present, there are 6443 level crossings in the country. Out of this figure Hospital Crossing is ranked number 580. However, if you compare this level crossing to other crossings of a similar type it is ranked 99 out of 2412. These figures are subject to change but were correct on 19 January 2021.

29 BWC/2.50 Hospital – Safety Management Information System

29.1 Network Rail's internal safety management information systems (SMIS) disclose that during the period of the previous 4 years, there were no reported incidents at the crossing. This does not mean that there has been no misuse of the crossing within this period. However, there is no recordable CCTV, which would have proven to the contrary.

29.2 In September 2021 a CCTV camera was placed at the crossing to identify the types of users and evidence has been gathered that proves that misuse at this crossing does take place regularly i.e.: school children walking up the track to the crossing, young people riding mopeds over the crossing, and also young people hanging around/sitting on the crossing environment. See photos below of misuse, additional video evidence can be provided.

FIGURE 24 HOSPITAL CROSSING MISUSE IMAGE 1

FIGURE 25 HOSPITAL CROSSING MISUSE IMAGE 2

FIGURE 26 HOSPITAL CROSSING MISUSE IMAGE 3

FIGURE 27 HOSPITAL CROSSING MISUSE IMAGE 4

FIGURE 28 HOSPITAL CROSSING MISUSE IMAGE 5

FIGURE 29 HOSPITAL CROSSING MISUSE IMAGE 6

30 BWC/2.50 Hospital – Options Evaluated

30.1 Detailed below are a series of options in terms of either removing or mitigating the risk to crossing users. The outline comments below show how these options have been considered.

Option	Term[1]	ALCRM risk score	ALCRM FWI	Safety Benefit	Comments
Close crossing by grade separated alternative	Long Term	M13	0.0	9.34329E-4 (100%)	Closure of this crossing is possible via:- • a grade separated alternative such as a bridge or underpass. • diversion of right of way
Installation of Red & Green miniature stop light warning system (MSL)	Long Term	D11	4.20551E-4	5.14E-4 (55%)	Upgrade to miniature stop light warning system would be a considered safety improvement as it would give users warning of an approaching train instead of looking out for trains. The system would also mitigate for inclement periods of weather that would reduce the sighting of approaching trains. Before this option can be further considered level crossing guidance document LCG15 '*Pedestrians willingness to wait at MSL crossings'* will need to be applied to ascertain if MSL's will be effective at this location
Educational Campaigns	Short / Mid Term	N/A	N/A	N/A	Educational campaigns using modern methods can be an effective tool to raise public awareness of the hazards and encourage safe and responsible behaviours at crossings. This in turn would help to reduce the risks of incidents and misuse. Awareness campaigns though do tend to have limited effectiveness on the public as they are easily forgotten shortly after.

31 BWC/2.50 Hospital – Northumberland Line Project Review

31.1 Project Overview

31.1.1 The project is proposing an increase in the number of trains to 66 passenger trains, 1 empty coaching stock train and 20 freight trains per day and a revised change of the line speed to 65 mph on the Up line and 55 mph on the down line[5], includes changes to the crossing environment within 700 metre of the crossing, such as new stations and track layouts. This also includes an amendment to the 9 Day Census based on the projected use provided by the project team which is an additional 260 pedestrians[6]

31.2 Amended Train Services

31.2.1 The proposed number of timetable trains running over the crossing is 87 per day however both timetabled and non-timetabled freight services can fluctuate daily to meet customer demand, operational requirements, engineering works or during times of disruption; so, the number of trains could exceed 87 per day.

31.3 Amended User Census Data

31.3.1 The project team has estimated that there will be an additional 260 pedestrian users per day once the project is completed. This brings the total number of users to 795.

User Type	Number
Pedestrians	741
Pedal Cyclists	54

31.4 Amended Hazards: Sighting and traverse

31.4.1 The proposed increase in line speed does not go above 100mph so there is no requirement to amend the decision point or crossing length

31.4.2 The proposed increase in line speed means the whistle board will no longer provide sufficient warning

	Line speed (mph)	Whistle board distance (m)	Whistle board warning time (secs)	Is the train horn clearly audible at the crossing?	Is the whistle board warning effective?	Comments on audibility and whistle board position
Up line (from Ashington to Newcastle)	65	179	5.62	Yes	No	The position of the whistle board does not give satisfactory warning to users of the crossing during daylight hours.

[5] Email from M Kitching dated 27 January 2021
[6] 1864_432_ LX Revised Flow and Speed Alterations v1.0 supplied 14 August 2020

31.5 The proposed change in line speed has resulted in a change in the minimum required sighting distance.

All distances are recorded in metres	Minimum sighting distance required	Measured sighting distance	Sighting distance measured to	Is sighting compliant?	If deficient, is sighting distance mitigated?	Notes on deficient sighting time mitigations
Up side looking toward up direction train approach	330	400	Bridge over old station before curvature of the track	Yes	N/A	N/A
Up side looking toward down direction train approach	280	522	Rear of train moving away from the crossing	Yes	N/A	N/A
Down side looking toward up direction train approach	330	407	Bridge over old station before curvature of the track	Yes	N/A	N/A
Down side looking toward down direction train approach	280	615	Rear of train moving away from the crossing	Yes	N/A	N/A

31.6 **Projected ALCRM Calculated Risk**

31.6.1 The new calculated ALCRM Risk Score for Hospital Crossing is: -

Proposal ALCRM risk score	
Individual risk	C
Collective risk	2
FWI	0.030630963
Safety Benefit FWI	-0.026086728
Safety Benefit percentage	-574.06%

31.6.2 At present, there are 2697 level crossings on the Eastern Region. This proposal will change the rank of Hospital Crossing to 38 in the Region. When you compare this level crossing to other crossings of a similar type will now be ranked 3 out of 878. These figures are subject to change but were correct on 19 January 2021.

31.6.3 At present, there are 6443 level crossings in the country. This proposal will change the rank of Hospital Crossing to 61 in the country. When you compare this level crossing to other crossings of a similar type it will now be ranked 4 out of 2412. These figures are subject to change but were correct on 19 January 2021.

31.7 Options Evaluated for the project

31.7.1 The options evaluated to mitigate the increased risks at Hospital Crossing include:

Option	ALCRM Risk Score	ALCRM FWI	Safety Benefit FWI	Safety Benefit percentage	Estimated Cost[7]	Benefit Cost Ratio
Closure	M13	0.000000000	0.030630963	100.00%	£2,040,000.00	0.61
Install MSL (overlay)	D2	0.014154439	0.016476524	53.79%	£150,000.00	2.47
Make sure WB are in the correct position and provide AWD	C2	0.025004868	0.005626095	18.37%	£38,245.45	1.82
Install MSL (Integrated)	D2	0.014154439	0.016476524	53.79%	£450,000.00	0.82
No Further Mitigation	C2	0.030630963	0.000000000	0.00%	N/A	N/A

CBA gives an indication of overall business benefit. It is used to support, not override, structured expert judgement when deciding which option(s) to progress.

The following CBA criteria are used as a support to decision making:

a. benefit to cost ratio is ≥ 1: positive safety and business benefit established;

b. benefit to cost ratio is between 0.99 and 0.5: reasonable safety and business benefit established where costs are not grossly disproportionate against the safety benefit; and

c. benefit to cost ratio is between 0.49 and 0.0: weak safety and business benefit established.

31.8 Conclusion and Recommendation

31.8.1 The proposed increase in trains moves this crossing in to the high risk category due to this increase in risk closure of the crossing is supported.

[7] Costs Supplied at a meeting held on 28th February 2021 between Network Rail & Kilborn Consulting

32 EJM/11.65 Lysdon Farm – Narrative Risk Assessment

Eastern Region - North & East route

Level Crossing Risk Assessment

Name of Crossing: Lysdon Farm

Type of crossing: FPS

Date of NRA: 23rd January 2018

Name of crossing	Lysdon Farm
Type	Footpath (FPS)
Engineers Line Reference (ELR)	EJM
Mileage	11m 65ch
OS grid reference	NZ309778
Number of lines crossed	One
Maximum Line speed (mph)	45
Electrification	No
Signal box	N/A
Risk assessment next due date	23/04/2021
ALCRM Risk Details	
Risk Score	E12
FWI	0.00000019

TABLE 4 OVERVIEW OF CROSSING DETAILS

32.1 As part of a level crossing risk assessment, data is entered into the industry accepted risk modelling support tool (ALCRM) which enables Network Rail to compare risk at all level crossings throughout the network. Results for this level crossing are provided below; see **Appendix A** - ALCRM for further details on how this is calculated.

32.2 Lysdon Farm crossing has an ALCRM score of E12 and an FWI of 0.00000019, this is from a risk assessment that was completed on 23.01.2018. The line speed is 45mph.

32.3 Lysdon Farm crossing is known as a passive crossing, meaning that users of the level crossing must decide for themselves whether it is safe to cross. The crossing is not controlled, equipped with lights, audible warnings or barriers interlocked with signals. Crossing safely relies entirely on users checking for approaching trains to ensure their personal safety. Users are instructed, at the decision point, 2m from the nearest running rail, by virtue of a sign to Stop Look Listen: Beware of trains.

32.4 The crossing distance is measured from this decision point, across the railway, to a position of safety 2m beyond the furthest running line. Decking is not provided over this level crossing.

32.5 There is an underbridge and footpath 150 metres from the crossing which could be used as an alternative route.

33 EJM/11.65 Lysdon Farm – Crossing imagery

FIGURE 30 EAST SIDE CROSSING APPROACH

FIGURE 31 WEST SIDE CROSSING APPROACH

FIGURE 32 EAST SIDE ACROSS THE CROSSING

FIGURE 33 WEST SIDE ACROSS THE CROSSING

FIGURE 34 AERIAL VIEW OF LYSDON FARM FOOTPATH CROSSING

FIGURE 35 UP SIDE (DOWN DIRECTION)

FIGURE 36 UP SIDE (UP DIRECTION)

FIGURE 37 DOWN SIDE LOOKING TOWARD UP APPROACHING TRAINS

FIGURE 38 DOWN SIDE LOOKING TOWARDS DOWN APPROACHING TRAINS

FIGURE 39 ORDNANCE SURVEY MAP VIEW OF LYSDON FOOTPATH CROSSING

34 EJM/11.65 Lysdon Farm – Crossing Environment

34.1 Lysdon Farm crossing is situated in Seaton Valley which is a civil parish in South East Northumberland, with a population of 15,049 increasing to 15,422 in 2011. It was created following the abolition of the Borough of Blyth Valley in 2008 and consists of the five villages of Holywell, New Hartley. Seaton Delaval, Seaton Sluice & Old Hartley and Seghill.

34.2 The crossing is a public footpath with stiles and consists of a rural area with fields or other open land in the vicinity.

34.3 At Lysdon Farm level crossing the orientation of the road/path from the north is 0°; the orientation of the railway from the north to the up line in the up direction is 0°.

34.4 There are no planned or apparent developments near the crossing which may lead to a change or increase in use or risk.

34.5 The crossing is in a remote rural location and there is no decking at the crossing and both approaches are steep. There is an underbridge and footpath 150 metres from the crossing which could be used as an alternative route.

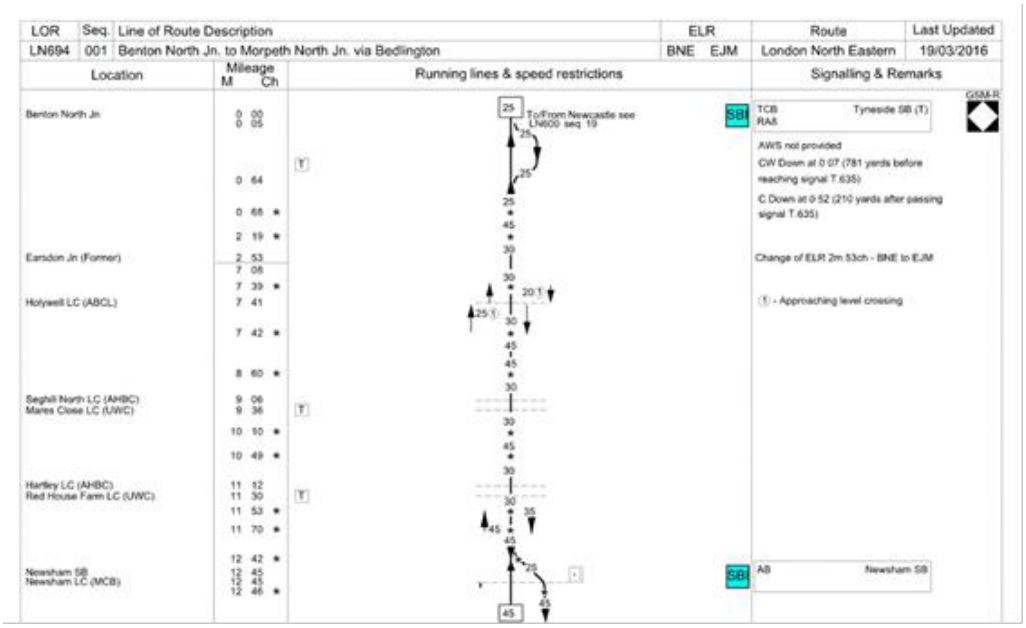


FIGURE 40 LOCATION OF LYSDON FARM CROSSING ON RAILWAY SECTIONAL APPENDIX RAIL MAP

35 EJM/11.65 Lysdon Farm – Train Service Data

35.1 The current number of train services over Lysdon Farm level crossing consists of freight trains. There are 7 trains per day. The highest permissible line speed of trains is 45mph. Trains are timetabled to run for 24 hours per day

36 EJM/11.65 Lysdon Farm – User Census Data

36.1 An estimated census has been used. The census was estimated on 23/01/2018 by LCM. The census applies to 100% of the year.

Pedestrians	FEW
Pedal cyclists	NO
Horses / riders	NO
Animals on the hoof	NO

36.2 The available information indicates that the crossing, which is in a remote location and has a low number of users and does not have a high proportion of vulnerable users or irregular users using this crossing.

36.3 Lysdon Farm crossing is remote and not in a tourist area, but it is possible to get the occasional walker who may use the crossing.

ALCRM: ALCRM calculates usage of the crossing to 0 road vehicles and 0 pedestrians and cyclist per day.

37 EJM/11.65 Lysdon Farm – HAZARDS – Sighting and Traverse

37.1 A decision point is a position where an individual would reasonably make a decision to cross the railway on the level.

37.2 Sighting is the distance that can be seen in both directions, for approaching trains.

37.3 At the crossing the sighting is compliant for all users traversing the crossing.

37.4 The length of the crossing from one side of the railway to the other side of the crossing is 6 metres when crossing from the up- side and 6 metres when crossing from the downside.

37.5 The traverse is as straight as possible. However, there is no decking at this crossing and steep approaches, which may slow users down.

All distances are recorded in metres	Minimum sighting distance required	Measured sighting distance	Sighting distance measured to	Is sighting compliant?	If deficient, is sighting distance mitigated?	Notes on deficient sighting time mitigations
Up side looking toward up direction train approach	102	652	Signal	Yes	YES	N/A
Up side looking toward down direction train approach	102	290	Track curve	Yes	YES	N/A
Down side looking toward up direction train approach	102	934	Vanish point	Yes	YES	N/A
Down side looking toward down direction train approach	102	490	Track curve	Yes	YES	N/A

37.6 The traverse times are calculated as:

	Traverse time (s)
Pedestrians	6

37.7 Traverse time has been calculated using Network Rail sighting calculation standards and are based on a traverse crossing speed of 1.189m/s and a traverse of 6 metres.

37.8 The steep approach and no deck present a tripping/slipping hazard to users. There are infrequent trains on this line which could be a risk to users as they could become complacent.

37.9 Sighting was measured by use of a range finder. A rangefinder is a device that measures distance from the observer to a target, in a process called ranging.

37.10 Sighting restrictions are recorded as follows:

	Up Direction	Down Direction
Nothing; vanishing point	YES	NO
Track curvature	NO	YES
Permanent structure (building/wall etc)	NO	NO
Signage or crossing equipment	NO	NO
Vegetation	NO	NO
Bad weather on the day of visit	NO	NO
Other	NO	NO

37.11 There are no known obstructions that could make it difficult for users to see approaching trains. There are no known issues with foliage, fog or other issues that might impair visibility of the crossing, crossing equipment or approaching trains.

38 EJM/11.65 Lysdon Farm – Identified Hazards, Risks and Mitigations

Hazard	Potential risk	Mitigations
Infrequent Trains	Fatality or serious injury	• Instructional signage • Adequate sighting distance is provided • Routine inspections
Slip, trip, falls, (uneven crossing surface)	Fatality or serious injury	• Crossing inspections and maintenance regime • Vegetation management plan
Impediment to hearing approaching trains (due to inclement weather)	Fatality or serious injury	• Level crossing signage • Vegetation management plan
Darkness	Fatality or serious injury	• Review of night time usage, completed
Vegetation growth between visits: impediment to sighting trains approaching crossing	Fatality or serious injury	• Vegetation management plan • Crossing inspections and maintenance regime
Unfamiliar users	Fatality or serious injury	• Regulatory Instructional signage at crossing • Remote location - no irregular or vulnerable users identified
Increased usage due to any future developments	Fatality or serious injury	• Review and update to risk assessment

39 EJM/11.65 Lysdon Farm – ALCRM CALCULATED RISK

39.1 Results for this level crossing are provided below; see **Appendix A** - ALCRM for further details on how this is calculated.

Safety risk				
Compared to other crossings the safety risk for this crossing is	**Individual risk**		**Collective risk**	
	E		**12**	
	Individual risk (fraction)	**Individual risk (numeric)**		
Van / small lorries	0	0	0	
HGV	0	0	0	
Bus	0	0	0	
Tractor / farm vehicle	0	0	0	
Cyclist / Motor cyclist	0	0	0	
Pedestrian	1 in 4694836	0.000000213	0.000008873	
				Derailment contribution
Passengers			0	0
Staff			0.000000001	0
Total			0.000000214	0
Collision frequencies	**Train / user**	**equipment**	**Other**	
Vehicle	0	0	0	
Pedestrian	0.000000235	0.000000288	0.00000079	
Collision risk	**Train / user**	**User equipment**	**Other**	
Vehicle	0	0	0	
Pedestrian	0.000000191	0.000000005	0.000000017	

39.2 At present, there are 2697 level crossings on the Eastern Region. Out of this figure Lysdon Farm crossing is ranked number 2520. However, if you compare this level crossing to other crossings of a similar type it is ranked 798 out of 878. These figures are subject to change but were correct on 19 January 2021.

39.3 At present, there are 6443 level crossings in the country. Out of this figure Lysdon Farm crossing is ranked number 6014. However, if you compare this level crossing to other crossings of a similar type it is ranked 2226 out of 2412. These figures are subject to change but were correct on 19 January 2021.

40 EJM/11.65 Lysdon Farm – Safety Management Information System

40.1 Network Rail's internal safety management information systems (SMIS) disclose that during the period of the previous 4 years, there were no reported incidents at the crossing. This does not mean that there has been no misuse of the crossing within this period. However, there is no recordable CCTV, which would have proven to the contrary.

41 EJM/11.65 Lysdon Farm – Options Evaluated

41.1 Detailed below are a series of options in terms of either removing or mitigating the risk to crossing users. The outline comments below show how these options have been considered.

Option	Term[1]	ALCRM risk score	ALCRM FWI	Safety Benefit	Comments
Close	Long Term	M13	0	2.14E-07	Closure of this crossing is considered feasible as an alternative routine can be provided using the existing highway.
Anti-slip decking provided	Long Term	D12	2.10E-07	-1.97E-04	If closure is not possible then installing a deck would remove the tripping/slipping hazard for users.

42 EJM/11.65 Lysdon Farm – Northumberland Line Project Review

42.1 Project Overview

42.1.1 The project is proposing an increase in the number of trains to 66 passenger trains, 1 empty coaching stock train and 20 freight trains per day and a revised change of the line speed to 75 mph on the Up line and 70 mph on the down line[8].

42.2 Amended Train Services

42.2.1 The proposed number of timetable trains running over the crossing is 87 per day however both timetabled and non-timetabled freight services can fluctuate daily to meet customer demand, operational requirements, engineering works or during times of disruption; so, the number of trains could exceed 87 per day

42.3 Amended User Census Data

42.3.1 The proposal does not affect the user census.

42.4 Amended Hazards: Sighting and traverse

42.4.1 The proposed increase in line speed does not go above 100mph so there is no requirement to amend the decision point or crossing length

42.4.2 The proposed change in line speed has resulted in a change in the minimum required sighting distance.

All distances are recorded in metres	Minimum sighting distance required	Measured sighting distance	Sighting distance measured to	Is sighting compliant?	If deficient, is sighting distance mitigated?	Notes on deficient sighting time mitigations
Up side looking toward up direction train approach	254	652	Signal	Yes	N/A	N/A
Up side looking toward down direction train approach	237	290	Track curve	Yes	N/A	N/A
Down side looking toward up direction train approach	254	934	Vanish point	Yes	N/A	N/A
Down side looking toward down direction train approach	237	490	Track curve	Yes	N/A	N/A

[8] Email from M Kitching dated 27 January 2021

42.5 **Projected ALCRM Calculated Risk**

42.5.1 The new calculated ALCRM Risk Score for Lysdon Farm Crossing is: -

Proposal ALCRM risk score	
Individual risk	C
Collective risk	10
FWI	0.000001556
Safety Benefit FWI	-0.000001342
Safety Benefit percentage	-627.10%

42.5.2 At present, there are 2697 level crossings on the Eastern Region. This proposal will change the rank of Lysdon Farm crossing to 2423 on the Region. When you compare this level crossing to other crossings of a similar type will now be ranked 730 out of 878. These figures are subject to change but were correct on 19 January 2021.

42.5.3 At present, there are 6443 level crossings in the country. This proposal will change the rank of Lysdon Farm crossing to 5626 in the country. When you compare this level crossing to other crossings of a similar type it will now be ranked 1958 out of 2412. These figures are subject to change but were correct on 19 January 2021.

42.6 Options Evaluated for the project

42.6.1 The options evaluated to mitigate the increased risks at Lysdon Farm include:

Option	ALCRM Risk Score	ALCRM FWI	Safety Benefit FWI	Safety Benefit percentage	Estimated Cost[9]	Benefit Cost Ratio
Closure	M13	0.000000000	0.000001556	100.00%	£2,040,000.00	0.00
Install MSL (Conventional)	D11	0.000000588	0.000000968	62.21%	£450,000.00	0.00
Install a deck	C10	0.000001525	0.000000031	1.99%	£63,378.17	0.00
Install MSL (overlay)	D11	0.000000588	0.000000968	62.21%	£150,000.00	0.00
No Further Mitigation	C10	0.000001307	0.000000249	16.00%	N/A	N/A

CBA gives an indication of overall business benefit. It is used to support, not override, structured expert judgement when deciding which option(s) to progress.

The following CBA criteria are used as a support to decision making:

a. benefit to cost ratio is ≥ 1: positive safety and business benefit established;

b. benefit to cost ratio is between 0.99 and 0.5: reasonable safety and business benefit established where costs are not grossly disproportionate against the safety benefit; and

c. benefit to cost ratio is between 0.49 and 0.0: weak safety and business benefit established.

42.7 Conclusion and Recommendation

42.7.1 Closure of this crossing is supported as this removes the risk from the network and there is an alternative route is available by the public highway

[9] Costs Supplied at a meeting held on 28th February 2021 between Network Rail & Kilborn Consulting

43 EJM/12.45 Newsham – Narrative Risk Assessment

Eastern Region - North & East route

Level Crossing Risk Assessment

Name of Crossing: Newsham

Type of crossing: User Worked Crossing with telephones
Date of NRA: 11th June 2019

Name of crossing	NEWSHAM
Type	MCB/MB
Engineers Line Reference (ELR)	EJM
Mileage	12m, 45ch
OS grid reference	NZ305789
Number of lines crossed	2
Maximum Line speed (mph)	45 Up, 25 Down
Electrification	No
Signal box	Newsham
Risk assessment next due date	31 July 2022
ALCRM Risk Details	
Risk Score	L6
FWI	0.000315523

TABLE 5 OVERVIEW OF CROSSING DETAILS

43.1 As part of a level crossing risk assessment, data is entered into the industry accepted risk modelling support tool (All Level Crossing Risk Model - ALCRM) which enables Network Rail to compare risk at all level crossings throughout the network. Results for this level crossing are provided below; see Appendix A for further details on how this is calculated.

43.2 Newsham has an ALCRM score of L6 and an FWI of 0.000315523, this is from a risk assessment that was completed on 30th April 2019. The line speed is 45 mph on the up line and 25 mph on the down line.

43.3 Newsham is known as a protected crossing. This means that the crossing is protected from train movements ensuring that trains are not authorised to pass over the crossing until the crossing is closed and the crossing area has been checked to be clear.

43.4 This type of crossing is protected by road traffic light signals and lifting barriers on both sides of the railway. An audible warning to pedestrians is also provided. The barriers are normally kept in the raised position and, when lowered, extend across the whole width of the carriageway on each approach.

44 EJM/12.45 Newsham – Crossing imagery

FIGURE 41 WEST SIDE CROSSING APPROACH

FIGURE 42 EAST SIDE CROSSING APPROACH

FIGURE 43 DN ACROSS THE CROSSING

FIGURE 44 UP ACROSS THE CROSSING

FIGURE 45 AERIAL VIEW OF NEWSHAM FOOTPATH CROSSING

FIGURE 46 UPSIDE (WEST SIDE) UP DIRECTION

FIGURE 47 UPSIDE (WEST SIDE) DOWN DIRECTION

FIGURE 48 DOWNSIDE (EAST SIDE) UP DIRECTION

FIGURE 49 DOWNSIDE (EAST SIDE) DOWN DIRECTION

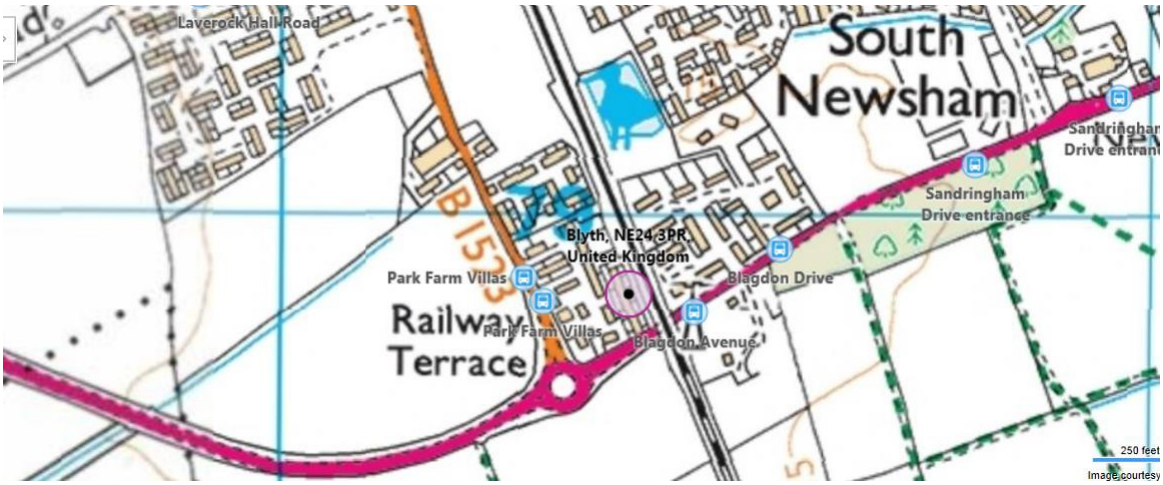


FIGURE 50 ORDNANCE SURVEY MAP VIEW OF NEWSHAM FOOTPATH CROSSING

45 EJM/12.45 Newsham – Crossing Environment

45.1 Blyth is a town and civil parish in Northumberland, with a population in 2011 of 37,339. The town is south of the River Blyth and is approximately 13 miles (21 km) northeast of Newcastle upon Tyne and 16 miles (26 km) north of Sunderland. It is 3.7 miles (6 km) east of Bedlington, 6.2 miles (10 km) northeast of Cramlington, 6.8miles (11 km) south-southeast of Ashington and 6.8 miles (11 km) south of Newbiggin-by-the-Sea. On the north side of the river are the villages of Choppingtpon, Bedlington, East Sleekburn, Cambois and North Blyth and to the south of the town are the villages of New Hartley, Seaton Delaval, Seaton Sluice and Cramlington.

45.2 Blyth is well served by roads. The A189 (Spine Road) which is accessible from the A1 via the A19. The A193 is the main road through Blyth and leads to Bedlington to the west and North Tyneside to the south. The other main route into Blyth is the A1061.

45.3 The nearest mainline railway station is Cramlington on the East Coast Main Line, approx. 5 miles from Blyth Town Centre and approx. 4 miles from Newsham LX. Local services (run by Northern Trains) from here go to Newcastle, Morpeth, Alnmouth, Prudhoe & Carlisle.

45.4 The crossing is a public highway crossing located on A1061 South Newsham Road

45.5 The crossing is a public footpath in a highly populated area, which connects a large residential area with the local public footpath network. There is a local community college and a playground (172m) in the nearby area of the crossing.

45.6 School children are not known to use this route. The closest educational establishments to this crossing are Newsham Primary School and New Delaval Primary School approx. 0.7 miles (approx. 1.2km) to the north of the crossing.

45.7 Leisure facilities are also situation on the east side of the crossing at South Newsham Pavilion and are within 380 meters of the crossing. As well as hosting sporting facilities, South Newsham Pavilion is home to Blyth Town F.C., a tenth-tier football team.

45.8 The crossing is located on the Earsdon and Morpeth Line (ELR – EJM) which currently consists of freight trains. The highest permissible speed is 45mph on the up-direction line (northbound) and 45mph which is on the down direction (southbound).

45.9 Local bus services Arriva North East and Go North East operate from Blyth linking to the rest of Northumberland and Newcastle. National Express services also arrive and depart from Blyth bus station, Bridge Street in the town centre.

45.10 The crossing is approx. 1.5 miles from the Port of Blyth – South Harbour Terminal, approx. 1.9 miles from Port of Blyth Offices, approx. 2.7 miles from Port of Blyth – Bates Terminal (Wimbourne Quay) and approx. 3.2 miles from Port of Blyth – Bates Terminal. Vehicular use for this crossing incudes heavy goods vehicles (HGV) using the port facilities.

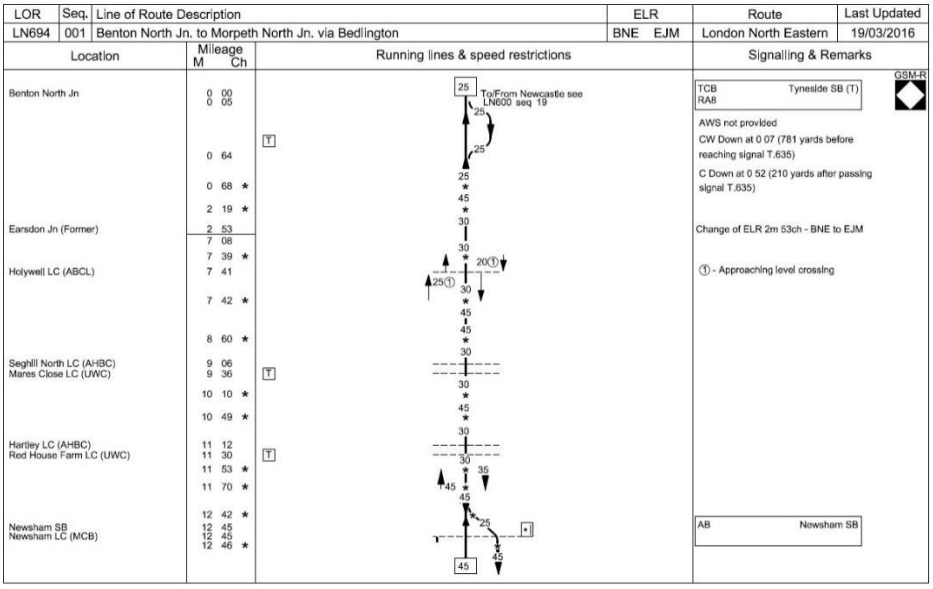


FIGURE 51 LOCATION OF NEWSHAM ON RAILWAY SECTIONAL APPENDIX RAIL MAP

46 EJM/12.45 Newsham – Train Service Data

46.1 The current number of timetable trains running over the crossing is 8 per day however both timetabled and non-timetabled freight services can fluctuate daily to meet customer demand, operational requirements, engineering works or during times of disruption. so, the number of trains could exceed 8 per day.

46.2 There is currently a consultation to increase freight train numbers and open the line up to passenger trains in the near future, which will impact on users of the crossing. See Section 64 for further details

46.3 Risk of trains passing each other in this vicinity is very low due to the number of freight trains. If trains were to pass each other in this vicinity, then the risk would be higher. As this means the road would be closed to traffic for longer.

46.4 This gives rise to a real risk of a user of the crossing trying to beat the barriers

47 EJM/12.45 Newsham – User Census Data

47.1 Tracsis were commissioned by Network Rail to undertake a census at this crossing. The survey remit required nine consecutive days to be surveyed. The survey was carried out from 12th September 2019and 29th September 2019, inclusive. The survey hours were 00.00 – 24.00 hours daily.

47.2 A total of 125975 users passed over the crossing during the nine-day survey.

47.3 The most recent 9-day census was completed between 1st June to 9th June 2019. The figures below are the average for a 7 day period including the busiest weekend

User Type	Number
Cars	12780
Vans / small lorries	1172
Buses	98
HGVs	214
Pedal / motor cyclists	157
Pedestrians	112
Tractors / farm vehicles	3
Horses / riders	2
Animals on the hoof	0

47.4 This would also likely include an increase in both vulnerable and encumbered users as well as unaccompanied children, dog walkers (with dogs off-lead) and cyclists.

47.5 Dog walkers are also at particular risk especially in circumstances where either the dog is not kept on a lead and/or the dog runs onto the crossing, which may in turn cause the owner distraction and may result in serious injury or fatality.

ALCRM: ALCRM calculates usage of the crossing to be 14267 Vehicles 269 pedestrians and cyclists per day by reference to data taken in 2019. This would have factored into account the occupation of proximate housing estates on both side of the crossing and school children using the crossing to get to and from school.

48 EJM/12.45 Newsham – HAZARDS

48.1 Crossing Approaches

48.1.1 Both approaches are long and straight with a 30mph speed limit of the road over the crossing.

48.1.2 As can be seen on the image below there are several distractions on the approaches to the crossing.

Key:
1. Newsham Level Crossing
2. Access road to houses, parking area and garages (2m)
3. Bus stop (15.5m)
4. Access to parking area (9.5m)
5. Blagdon Drive (85m)
6. Access to road to house and land (85m)
7. Roundabout (110m)

48.1.3 The distractions on the east side of the crossing are 4 - Access to parking area (9.5m), 3 - Bus stop (15.5m), 5 - Blagdon Drive (85m)Blagdon Drive and 6 - Access to road to house and land (85m)

48.1.4 The distractions on the west side of the crossings are 2 - Access road to houses, parking area and garages (2m) and 7 - Roundabout (110m). The roundabout is very busy during peak times.

48.1.5 Vehicles are known to park on the side of the road on the crossing approaches

48.1.6 During the 9 day census a road speed census was carried out.

48.1.7 During the survey 33.83% of Eastbound vehicles were approaching the crossing greater than the posted speed limit. The average speed of vehicles on an eastbound approach to the crossing was 28 mph. The 85th-percentile[10] speed was 32mph

48.1.8 During the survey 52.75% of westbound vehicles were approaching the crossing greater than the posted speed limit. The average speed of vehicles on a westbound approach to the crossing was 30mph. The 85th-percentile[11] speed was 35mph

[10] the speed at or below which 85% of vehicles are travelling
[11] the speed at or below which 85% of vehicles are travelling

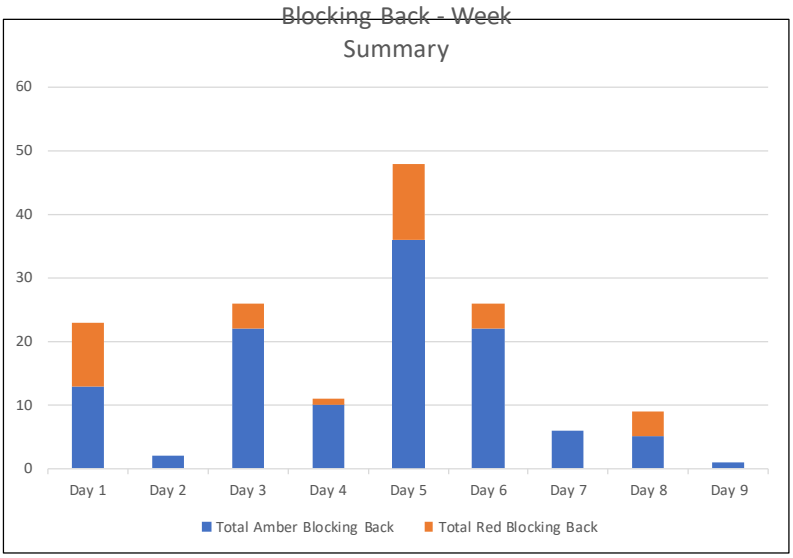
48.2 Blocking Back

48.2.1 Blocking back at a level crossing is when there is the formation of a stationary or slow-moving queue of road traffic over a level crossing due to road traffic conditions causing obstruction of the railway line.

48.2.2 As part of the 9 day census instances of when vehicles are forced to stop on or near the crossing due to queuing were also monitored, coded to the following:

- Amber 1: Rear of queue extends to between 11m and 50m downstream of the crossing.
- Amber 2: Rear of queue extends to between the crossing barrier and 11m downstream.
- Red 1: Vehicle fouls the barrier but not within 1.25m of the running line.
- Red 2: Vehicle fouls the crossing line, or within 1.25m either side of the running line and are stationary for three or more seconds.
- Red 3: Similar to Red 2, but where no escape route is available, either forwards or backwards.

48.2.3 Blocking Back incidents are greater in number during weekdays, with an average of about 23 Blocking Back incidents per day. On weekend days the number of trains is reduced, with an average of about 9 Blocking Back incidents per day. A graph of Blocking Back incidents per survey day, for both amber and red incidents, is shown below



48.2.4 Newsham level crossing is monitored by the signaller when activating the crossing which reduces the risk of a user being trapped on the crossing.

48.3 Strike In times

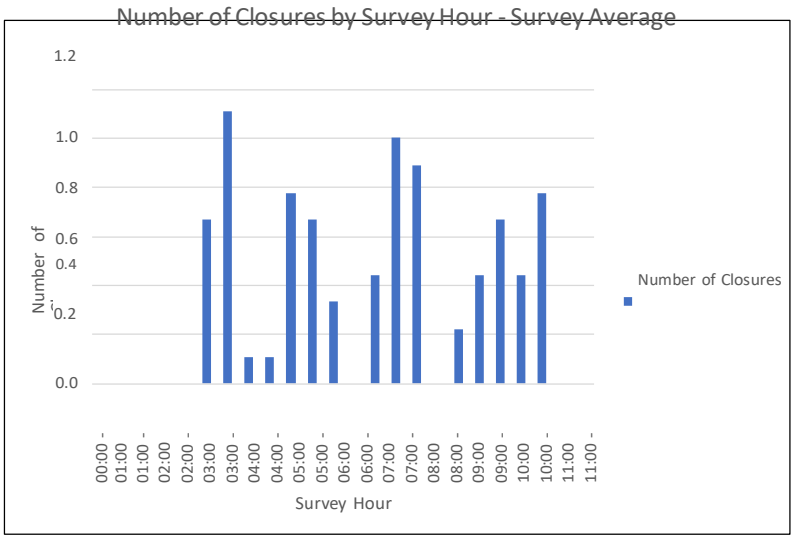
48.3.1 At an MCB/MB crossing there are no designed Strike-In Times[12] as the signaller controls the crossing sequence.

48.3.2 As part of the 9 day census road closure analysis was conducted to record the periods where movement of vehicles and pedestrians over the level crossing is impeded by the complete operational cycle of equipment. This includes:-

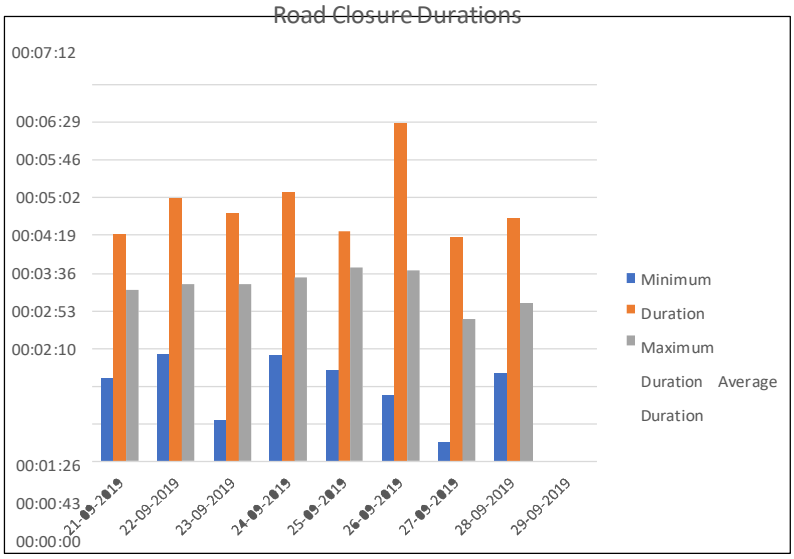
- The barrier open and closure times, and the duration the road was closed in each instance.
- The minimum, maximum, and average road closure times.
- Whether or not a train utilises the crossing during each cycle of closure equipment.

[12] Strike-in time is when the train has reached the strike-in point and the closure sequence begins to allow the crossing to be fully closed by the time the train arrives at the crossing.

48.3.3 During the survey, the road was closed an average of 9 times each survey day. The road was most frequently closed between the hours of 06:00 - 07:00, with an average of 1.2 closures during this hour each day over the survey period.



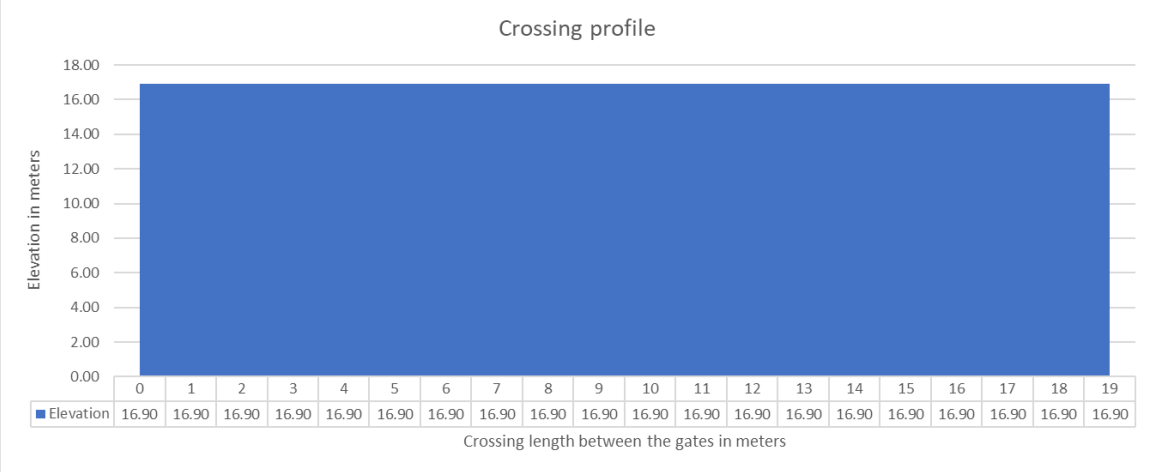
48.3.4 The minimum duration of closure was 00:00:21, the maximum duration of closure was 00:06:28, and the average duration of closure was 00:03:20 over the survey period.



48.4 Grounding Risk

48.4.1 The visual evaluation of the vertical profile of the road indicates that it does not create a risk of vehicles grounding on the crossing. Risk of grounding signs have not been provided at the crossing.

48.4.2 As can be seen from the crossing profile chart below there isn't a risk of a vehicle getting stuck on the crossing due to the road profile.



49 EJM/12.45 Newsham – Identified Hazards, Risks and Mitigations

Hazard	Potential risk	Mitigations
Trains	Fatality or serious injury	• Instructional signage • Adequate sighting distance is provided • Whistle board installed
Slip, trip, falls, (uneven crossing surface)	Fatality or serious injury	• Appropriate crossing decking for crossing type and location • Crossing inspections and maintenance regime • Vegetation management plan
Impediment to hearing approaching trains (due to inclement weather)	Fatality or serious injury	• Level crossing signage • Vegetation management plan • Train warning given
Darkness	Fatality or serious injury	• Review of night time usage, completed
Vegetation growth between visits: impediment to sighting trains approaching crossing	Fatality or serious injury	• Vegetation management plan • Crossing inspections and maintenance regime
Unfamiliar users	Fatality or serious injury	• Regulatory Instructional signage at crossing
Increased usage due to any future developments	Fatality or serious injury	• Review and update to risk assessment

50 EJM/12.45 Newsham – ALCRM CALCULATED RISK

50.1 Results for this level crossing are provided below; see **Appendix A** - ALCRM for further details on how this is calculated.

Safety risk				
Compared to other crossings the safety risk for this crossing is	**Individual risk**		**Collective risk**	
	L		**6**	
	Individual risk (fraction)	**Individual risk (numeric)**		
Van / small lorries	1 in 3194889	0.000000313	0.000024425	
HGV	1 in 1773050	0.000000564	0.000001469	
Bus	1 in 8130082	0.000000123	0.000000673	
Tractor / farm vehicle	1 in 24845	0.00004025	0.000000021	
Cyclist / Motor cyclist	1 in 881058	0.000001135	0.000130113	
Pedestrian	1 in 881058	0.000001135	0.000092819	
				Derailment contribution
Passengers			0	0
Staff			0.000067361	0.883472266
Total			0.000583217	0.102040338
frequencies	**Train / user**	**equipment**	**Other**	
Vehicle	0.000777323	0.01393716	0.00067209	
Pedestrian	0.000080801	0.000341164	0.006902867	
Collision risk	**Train / user**	**User equipment**	**Other**	
Vehicle	0.000292924	0	0	
Pedestrian	0.000065611	0.000005459	0.000151863	

50.2 At present, there are 2697 level crossings on the Eastern Region. Out of this figure Newsham crossing is ranked number 1015. However, if you compare this level crossing to other crossings of a similar type it is ranked 60 out of 89. These figures are subject to change but were correct on 19 January 2021.

50.3 At present, there are 2697 level crossings on the Eastern Region. Out of this figure Newsham crossing is ranked number 1015. However, if you compare this level crossing to other crossings of a similar type it is ranked 60 out of 89. These figures are subject to change but were correct on 19 January 2021.

51 EJM/12.45 Newsham – Safety Management Information System

51.1 Network Rail's internal safety management information systems (SMIS) disclose that during the period of the previous 4 years, there were no reported incidents at the crossing. However, this does not mean that we do not have misuse that does not take place it is maybe due to no recordable CCTV at the crossing to provide the evidence needed. Newsham is a manned crossing with Newsham South Signal Box, located on the DOWN side, overlooking the crossing.

52 EJM/12.45 Newsham – Options Evaluated

52.1 Detailed below are a series of options in terms of either removing or mitigating the risk to crossing users. The outline comments below show how these options have been considered.

Option	Term[1]	ALCRM risk score	ALCRM FWI	Safety Benefit	Comments
Close crossing	Long Term	M13	0.00E+00	5.83E-04	Closure of this crossing is possible via:- • a grade separated alternative such as a bridge or underpass. • diversion of right of way
Upgrade to MCBOD	Medium Term	L6	2.78E-04	3.06E-04	Option to be considered when the crossing is renewed. This removes the risk of human error when the signaller checks that the crossing is clear.
Educational Campaigns	Short / Mid Term	N/A	N/A	N/A	Educational campaigns using modern methods can be an effective tool to raise public awareness of the hazards and encourage safe and responsible behaviours at crossings. This in turn would help to reduce the risks of incidents and misuse. Awareness campaigns though do tend to have limited effectiveness on the public as they are easily forgotten shortly after.

53 EJM/12.45 Newsham – Northumberland Line Project Review

53.1 Project Overview

53.1.1 The project is proposing an increase in the number of trains to 66 passenger trains, 1 empty coaching stock train and 20 freight trains per day and a revised change of the line speed to 75 mph on the Up line and 70 mph on the down line[13], includes changes to the crossing environment within 700 metre of the crossing, such as new stations and track layouts.

53.2 Amended Train Services

53.2.1 The proposed number of timetable trains running over the crossing is 87 per day however both timetabled and non-timetabled freight services can fluctuate daily to meet customer demand, operational requirements, engineering works or during times of disruption; so, the number of trains could exceed 87 per day

53.3 Amended Environment Details

53.3.1 There is a station being built within 75m of the crossing

53.4 Amended User Census Data

53.4.1 The proposal does not affect the user census.

53.5 Amended Hazards: Sighting and traverse

53.5.1 The proposed increase in line speed does not go above 100mph so there is no requirement to amend the decision point or crossing length

53.5.2 The proposed change in line speed has resulted in a change in the minimum required sighting distance.

53.6 Projected ALCRM Calculated Risk

53.6.1 The new calculated ALCRM Risk Score for Newsham is: -

Proposal ALCRM risk score	
Individual risk	G
Collective risk	3
FWI	0.008857594
Safety Benefit FWI	-0.008274377
Safety Benefit percentage	-1418.75%

53.6.2 At present, there are 2697 level crossings on the Eastern Region. This proposal will change the rank of Newsham crossing to 158 on the Region. When you compare this level crossing to other crossings of a similar type will now be ranked 15 out of 89. These figures are subject to change but were correct on 19 January 2021.

53.6.3 At present, there are 6443 level crossings in the country. This proposal will change the rank of Newsham crossing to 308 in the country. When you compare this level crossing to other crossings of a similar type it will now be ranked 25 out of 174. These figures are subject to change but were correct on 19 January 2021.

[13] Email from M Kitching dated 27 January 2021

53.7 Options Evaluated for the Project

53.7.1 The options evaluated to mitigate the increased risks at Newsham include:

Option	ALCRM Risk Score	ALCRM FWI	Safety Benefit FWI	Safety Benefit percentage	Estimated Cost[14]	Benefit Cost Ratio
Closure	M13	0.000000000	0.008857594	100.00%	£8,040,000.00	0.04
Upgrade to MCBOD	I4	0.003513366	0.005344228	60.33%	£2,196,381.27	0.05
Upgrade to CCTV	I4	0.003513366	0.005344228	60.33%	£2,076,181.30	0.06
Fit Red light Safety Equipment	G3	0.008680442	0.000177152	2.00%	£150,000.00	0.00
Upgrade to MCBOD Inc Pedestrian Stop Signal	I4	0.003407965	0.005449629	61.52%	£2,271,381.27	0.05
Upgrade to CCTV Inc. Pedestrian Stop Signal	I4	0.003513366	0.005344228	60.33%	£2,151,181.30	0.06
No Further Mitigations	G3	0.008857594	0.000000000	0.00%	N/A	N/A

CBA gives an indication of overall business benefit. It is used to support, not override, structured expert judgement when deciding which option(s) to progress.

The following CBA criteria are used as a support to decision making:

a. benefit to cost ratio is ≥ 1: positive safety and business benefit established;

b. benefit to cost ratio is between 0.99 and 0.5: reasonable safety and business benefit established where costs are not grossly disproportionate against the safety benefit; and

c. benefit to cost ratio is between 0.49 and 0.0: weak safety and business benefit established.

53.8 Conclusion and Recommendation

53.8.1 The proposed increase in trains moves this crossing in to the high risk category due to this increase in risk closure of the crossing is supported.

[14] Costs Supplied at a meeting held on 28th February 2021 between Network Rail & Kilborn Consulting

54 EJM/14.12 Chase Meadows – Narrative Risk Assessment

Eastern Region - North & East route

Level Crossing Risk Assessment

Name of Crossing: Chase Meadows

Type of crossing: Footpath with Wicket Gates Date of NRA: 11th June 2019

Name of crossing	CHASE MEADOWS
Type	FPW
Engineers Line Reference (ELR)	EJM
Mileage	14m, 12ch
OS grid reference	NZ288807
Number of lines crossed	2
Maximum Line speed (mph)	45
Electrification	No
Signal box	Newsham Bedlington South
Risk assessment next due date	11 September 2022
ALCRM Risk Details	
Risk Score	D7
FWI	0.000055785

TABLE 6 OVERVIEW OF CROSSING DETAILS

TABLE 7 OVERVIEW OF CROSSING DETAILS

54.1 As part of a level crossing risk assessment, data is entered into the industry accepted risk modelling support tool (ALCRM) which enables Network Rail to compare risk at all level crossings throughout the network. Results for this level crossing are provided below; see **Appendix A** - ALCRM for further details on how this is calculated.

54.2 Chase Meadows has an ALCRM score of D7and an FWI of 0.000055785, this is from a risk assessment that was completed on 11th June 2019. The line speed is 45 mph on the up line and 45 mph on the down line.

54.3 Chase Meadows is known as a passive crossing, meaning that users of the level crossing must decide for themselves whether it is safe to cross. The crossing is not controlled, equipped with lights, audible warnings or barriers interlocked with signals. Crossing safely relies entirely on users checking for approaching trains to ensure their personal safety. Users are instructed, at the decision point, 2m from the nearest running rail, by virtue of a sign to Stop Look Listen: Beware of trains. The crossing distance is measured from this decision point, across the railway, to a position of safety 2m beyond the furthest running line.

55 EJM/14.12 Chase Meadows – Crossing imagery

FIGURE 52 WEST SIDE CROSSING APPROACH

FIGURE 53 EAST SIDE CROSSING APPROACH

FIGURE 54 WEST SIDE ACROSS THE CROSSING

FIGURE 55 EAST SIDE ACROSS THE CROSSING

FIGURE 56 AERIAL VIEW OF CHASE MEADOWS FOOTPATH CROSSING

FIGURE 57 UPSIDE (WEST SIDE) UP DIRECTION

FIGURE 58 UPSIDE (WEST SIDE) DOWN DIRECTION

FIGURE 59 DOWNSIDE (EAST SIDE) UP DIRECTION

FIGURE 60 DOWNSIDE (EAST SIDE) DOWN DIRECTION

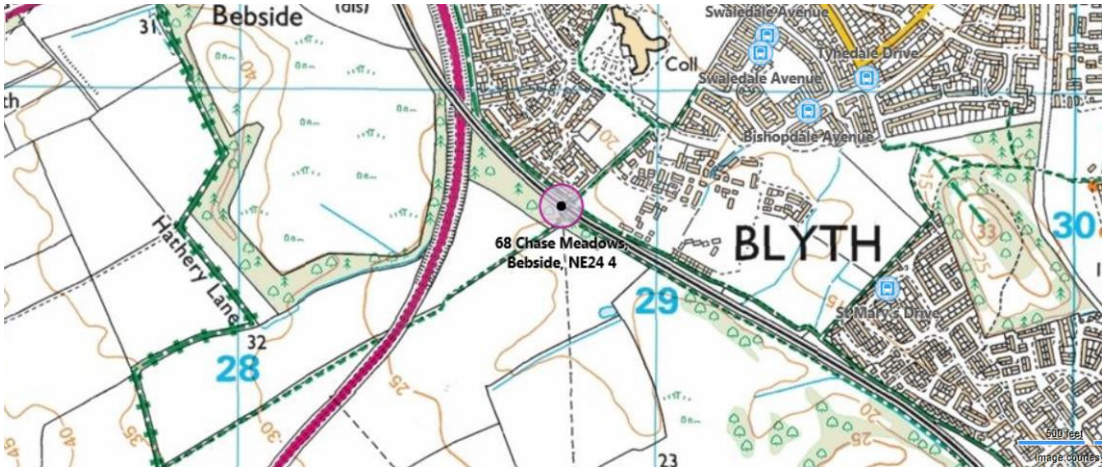


FIGURE 61 ORDNANCE SURVEY MAP VIEW OF CHASE MEADOWS FOOTPATH CROSSING

56 EJM/14.12 Chase Meadows – Crossing Environment

56.1 Blyth is a town and civil parish in Northumberland, with a population in 2011 of 37,339. The town is south of the River Blyth and is approximately 13 miles (21 km) northeast of Newcastle upon Tyne and 16 miles (26 km) north of Sunderland. It is 3.7 miles (6 km) east of Bedlington, 6.2 miles (10 km) northeast of Cramlington, 6.8miles (11 km) south-southeast of Ashington and 6.8 miles (11 km) south of Newbiggin-by-the-Sea. On the north side of the river are the villages of East Sleekburn, Cambois and North Blyth and to the south of the town are the villages of New Hartley, Seaton Delaval and Seaton Sluice.

56.2 Blyth is well served by roads. The A189 (Spine Road) which is accessible from the A1 via the A19. The A193 is the main road through Blyth and leads to Bedlington to the west and North Tyneside to the south. The other main route into Blyth is the A1061.

56.3 The nearest mainline railway station is Cramlington on the East Coast Main Line, about 5 miles from the town centre. Local services from here go to Newcastle, Morpeth, and Alnmouth.

56.4 The crossing is a public footpath in a highly populated area, which connects a large residential area with the local public footpath network. There is a local community college and a playground (172m) in the nearby area of the crossing.

56.5 School children are not known to use this route. Blyth Community college is 350m from the crossing on the upside, .

56.6 Leisure facilities are also situation on the west side of the crossing and are approximately within 350 meters of the crossing.

56.7 The crossing is located on the Newbiggin to Newcastle line which currently consists of freight trains. The highest permissible speed is 45mph on the up-direction line (northbound) and 45mph which is on the down direction (southbound).

56.8 Local bus services Arriva North East and Go North East operate from Blyth linking to the rest of Northumberland and Newcastle. National Express services also arrive and depart from Bridge Street.

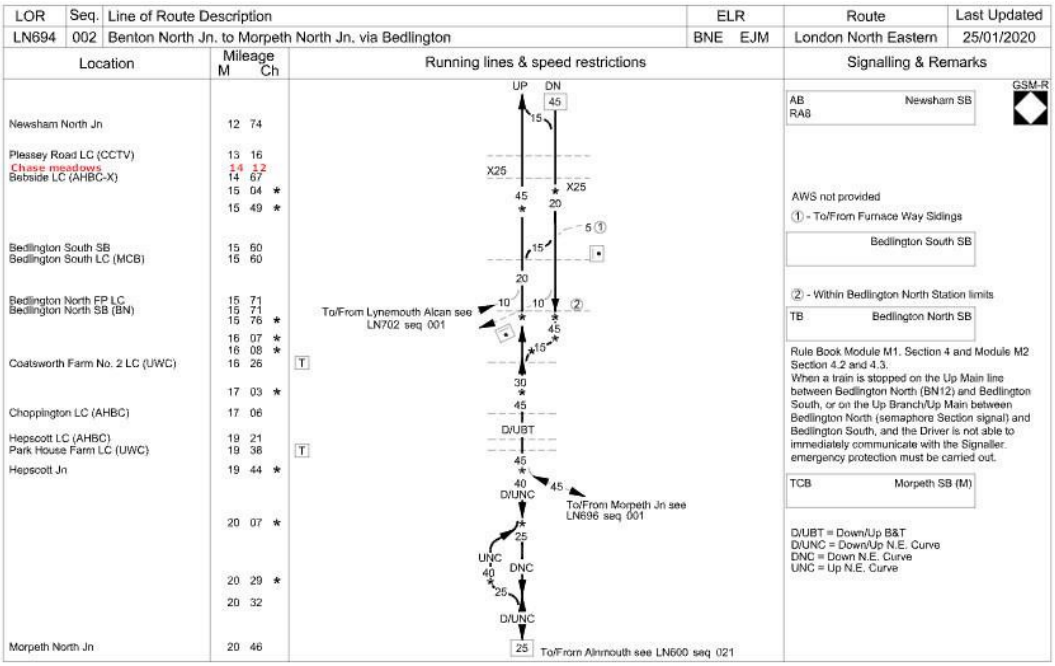


FIGURE 62 LOCATION OF CHASE MEADOWS ON RAILWAY SECTIONAL APPENDIX RAIL MAP

57 EJM/14.12 Chase Meadows – Train Service Data

57.1 The current number of timetable trains running over the crossing is 8 per day however both timetabled and non-timetabled freight services can fluctuate daily to meet customer demand, operational requirements, engineering works or during times of disruption. so, the number of trains could exceed 8 per day.

57.2 There is currently a consultation to increase freight train numbers and open the line up to passenger trains in the near future, which will impact on users of the crossing. See Section 64 for further details

57.3 Risk of trains passing each other in this vicinity is very low due to the number of freight trains. If trains were to pass each other in this vicinity, then the risk would be higher. This means that a train travelling towards the crossing in an opposite direction to another train is temporarily obscured by that train when having just passed over the crossing.

57.4 This gives rise to a real risk of a user of the crossing stepping out immediately after a train has passed and directly into the path of an approaching train from the opposite direction which they have neither seen nor heard.

57.5 Freight trains can be of a length exceeding 200 meters and can easily obscure from sight. There is also a continuing risk that pedestrians do not stop, look and listen for approaching trains when crossing the railway. Users might look but many (if not most) will typically focus their sight in just the one direction and wrongly assume that the crossing is clear when the train approaching from that direction has passed. Users are likely to overlook the possibility that a second train may also be approaching from the opposite direction.

58 EJM/14.12 Chase Meadows – User Census Data

58.1 Tracsis were commissioned by Network Rail to undertake a census at this crossing. The survey remit required nine consecutive days to be surveyed. The survey was carried out from 1st June to 9th June 2019, inclusive. The survey hours were 00.00 – 24.00 hours daily.

58.2 A total of 805 users passed over the crossing during the nine-day survey.

58.3 The most recent 9-day census was completed between 1st June to 9th June 2019. The figures below are the average for a 7 day period including the busiest weekend

User Type	Number
Pedestrians	95
Pedal Cyclists	1

58.4 This would also likely include an increase in both vulnerable and encumbered users as well as unaccompanied children, dog walkers (with dogs off-lead) and cyclists.

58.5 Dog walkers are also at particular risk especially in circumstances where either the dog is not kept on a lead and/or the dog runs onto the crossing, which may in turn cause the owner distraction and may result in serious injury or fatality.

ALCRM: ALCRM calculates usage of the crossing to be 95 pedestrians and 1 cyclists per day by reference to data taken in 2019. This would have factored into account the occupation of proximate housing estates on both side of the crossing and school children using the crossing to get to and from school.

59 EJM/14.12 Chase Meadows – HAZARDS – Sighting and Traverse

59.1 A decision point is a position where an individual would reasonably make a decision to cross the railway on the level.

59.2 Sighting is the distance that can be seen in both directions, for approaching trains.

59.3 At the crossing the sighting is compliant for all users traversing the crossing.

59.4 The length of the crossing from one side of the railway to the other side of the crossing is 9 meters when crossing from the up- side and 9 meters when crossing from the downside.

59.5 The crossing is not provided with whistle-boards

59.6 The crossing has rubber decking and is considered wide enough for all users of the crossing. It is fitted with a non-slip surface.

59.7 The traverse times are calculated as:

	Traverse time (s)
Pedestrians	12

59.8 Traverse time has been calculated using Network Rail sighting calculation standard are based on traverse crossing speed of 1.189m/s and a traverse of 9.5 metres for a non-vulnerable user. 50% has been added due to school children from the nearby schools using the crossing on a daily basis.

59.9 Sighting was measured by use of a range finder. A rangefinder is a device that measures distance from the observer to a target, in a process called ranging.

All distances are recorded in metres	Minimum sighting distance required	Measured sighting distance	Sighting distance measured to	Is sighting compliant?	If deficient, is sighting distance mitigated?	Notes on deficient sighting time mitigations
Up side looking toward up direction train approach	242	196	Track curve	No	N/A	The crossing has the required sighting for a non-vulnerable user. Vulnerable use was only identified after a recent 9 Day census
Up side looking toward down direction train approach	242	365	Track curve	Yes	N/A	N/A

All distances are recorded in metres	Minimum sighting distance required	Measured sighting distance	Sighting distance measured to	Is sighting compliant?	If deficient, is sighting distance mitigated?	Notes on deficient sighting time mitigations
Down side looking toward up direction train approach	242	346	Track curve	Yes	N/A	N/A
Down side looking toward down direction train approach	242	442	Track curve	Yes	N/A	N/A

59.10 Sighting restrictions are recorded as follows:

	Up Direction	Down Direction
Nothing; vanishing point	NO	NO
Track curvature	YES	YES
Permanent structure (building/wall etc.)	NO	NO
Signage or crossing equipment	NO	NO
Vegetation	NO	NO
Bad weather on the day of visit	NO	NO
Other	NO	NO

59.11 There are no known obstructions that could make it difficult for users to see approaching trains. There are no known issues with foliage, fog or other issues that might impair visibility of the crossing, crossing equipment or approaching trains.

60 EJM/14.12 Chase Meadows – Identified Hazards, Risks and Mitigations

Hazard	Potential risk	Mitigations
Trains	Fatality or serious injury	• Instructional signage • Adequate sighting distance is provided • Whistle board installed
Slip, trip, falls, (uneven crossing surface)	Fatality or serious injury	• Appropriate crossing decking for crossing type and location • Crossing inspections and maintenance regime • Vegetation management plan
Impediment to hearing approaching trains (due to inclement weather)	Fatality or serious injury	• Level crossing signage • Vegetation management plan • Train warning given
Darkness	Fatality or serious injury	• Review of night time usage, completed
Vegetation growth between visits: impediment to sighting trains approaching crossing	Fatality or serious injury	• Vegetation management plan • Crossing inspections and maintenance regime
Unfamiliar users	Fatality or serious injury	• Regulatory Instructional signage at crossing
Increased usage due to any future developments	Fatality or serious injury	• Review and update to risk assessment

61 EJM/14.12 Chase Meadows – ALCRM CALCULATED RISK

61.1 Results for this level crossing are provided below; see **Appendix A** - ALCRM for further details on how this is calculated.

Safety risk				
Compared to other crossings the safety risk for this crossing is	**Individual risk**		**Collective risk**	
	D		**7**	
	Individual risk (fraction)	**Individual risk (numeric)**		
Van / small lorries	0	0	0	
HGV	0	0	0	
Bus	0	0	0	
Tractor / farm vehicle	0	0	0	
Cyclist / Motor cyclist	0	0	0	
Pedestrian	1 in 105285	0.000009498	0.00005547	
				Derailment contribution
Passengers			0	0
Staff			0.000000316	0
Total			0.000055785	0
frequencies	**Train / user**	**equipment**	**Other**	
Vehicle	0	0	0	
Pedestrian	0.000063119	0.000070143	0.000192137	
Collision risk	**Train / user**	**User equipment**	**Other**	
Vehicle	0	0	0	
Pedestrian	0.000050227	0.0000011	0.000004142	

61.2 At present, there are 2697 level crossings on the Eastern Region. Out of this figure Chase Meadows crossing is ranked number 961. However, if you compare this level crossing to other crossings of a similar type it is ranked 186 out of 878. These figures are subject to change but were correct on 19 January 2021.

61.3 At present, there are 6443 level crossings in the country. Out of this figure Chase Meadows crossing is ranked number 1892. However, if you compare this level crossing to other crossings of a similar type it is ranked 442 out of 2412. These figures are subject to change but were correct on 19 January 2021.

62 EJM/14.12 Chase Meadows – Safety Management Information System

62.1 Network Rail's internal safety management information systems (SMIS) disclose that during the period of the previous 4 years, there were no reported incidents at the crossing. This does not mean that there has been no misuse of the crossing within this period. However, there is no recordable CCTV, which would have proven to the contrary.

62.2 There are known issues of vandalism problems e.g., the gate spring has been repeatedly stolen

63 EJM/14.12 Chase Meadows – Options Evaluated

63.1 Detailed below are a series of options in terms of either removing or mitigating the risk to crossing users. The outline comments below show how these options have been considered.

Option	Term[1]	ALCRM risk score	ALCRM FWI	Safety Benefit	Comments
Close crossing	Long Term	M13	0.0	9.61E-4	Closure of this crossing is possible via:- • a grade separated alternative such as a bridge or underpass. • diversion of right of way
Installation of Red & Green miniature stop light warning system (MSL)	Medium Term	F6	1.16E-4	8.45E-4	Upgrade to miniature stop light warning system would be a considered safety improvement as it would give users warning of an approaching train instead of looking out for trains. The system would also mitigate for inclement periods of weather that would reduce the sighting of approaching trains.
Educational Campaigns	Short / Mid Term	N/A	N/A	N/A	Educational campaigns using modern methods can be an effective tool to raise public awareness of the hazards and encourage safe and responsible behaviours at crossings. This in turn would help to reduce the risks of incidents and misuse. Awareness campaigns though do tend to have limited effectiveness on the public as they are easily forgotten shortly after.

64 EJM/14.12 Chase Meadows – Northumberland Line Project Review

64.1 Project Overview

64.1.1 The project is proposing an increase in the number of trains to 66 passenger trains, 1 empty coaching stock train and 20 freight trains per day and a revised change of the line speed to 75 mph on the Up line and 75 mph on the down line[15], includes changes to the crossing environment within 700 metres of the crossing, such as new stations and track layouts.

64.2 Amended Train Services

64.2.1 The proposed number of timetable trains running over the crossing is 87 per day however both timetabled and non-timetabled freight services can fluctuate daily to meet customer demand, operational requirements, engineering works or during times of disruption; so, the number of trains could exceed 87 per day

64.3 Amended User Census Data

64.3.1 The proposal does not affect the user census.

64.4 Amended Hazards: Sighting and traverse

64.4.1 The proposed increase in line speed does not go above 100mph so there is no requirement to amend the decision point or crossing length

64.5 The proposed change in line speed has resulted in a change in the minimum required sighting distance.

All distances are recorded in metres	Minimum sighting distance required	Measured sighting distance	Sighting distance measured to	Is sighting compliant?	If deficient, is sighting distance mitigated?	Notes on deficient sighting time mitigations
Up side looking toward up direction train approach	402	196	Track curve	No	No	
Up side looking toward down direction train approach	402	365	Track curve	No	No	
Down side looking toward up direction train approach	402	346	Track curve	No	No	
Down side looking toward down direction train approach	402	442	Track curve	Yes	N/A	

[15] Email from M Kitching dated 27 January 2021

64.6 Projected ALCRM Calculated Risk

64.6.1 The new calculated ALCRM Risk Score for Chase Meadows is: -

Proposal ALCRM risk score	
Individual risk	C
Collective risk	4
FWI	0.004459103
Safety Benefit FWI	-0.003789540
Safety Benefit percentage	-565.97%

64.6.2 At present, there are 2697 level crossings on the Eastern Region. This proposal will change the rank of Chase Meadows crossing to 322 on the Region. When you compare this level crossing to other crossings of a similar type will now be ranked 49 out of 878. These figures are subject to change but were correct on 19 January 2021.

64.6.3 At present, there are 6443 level crossings in the country. This proposal will change the rank of Chase Meadows crossing to 602 in the country. When you compare this level crossing to other crossings of a similar type it will now be ranked 102 out of 2412. These figures are subject to change but were correct on 19 January 2021.

64.7 Options Evaluated for the project

64.7.1 The options evaluated to mitigate the increased risks at Chase Meadows include:

Option	ALCRM Risk Score	ALCRM FWI	Safety Benefit FWI	Safety Benefit percentage	Estimated Cost[16]	Benefit Cost Ratio
Closure	M13	0.000000000	0.004459103	100.00%	£2,040,000.00	0.09
Install MSL (Conventional)	D4	0.001709785	0.002749318	61.66%	£450,000.00	0.14
Install MSL (overlay)	D4	0.001709785	0.002749318	61.66%	£150,000.00	0.41
No Further Mitigations	C4	0.004459103	0.000000000	0.00%	N/A	N/A

CBA gives an indication of overall business benefit. It is used to support, not override, structured expert judgement when deciding which option(s) to progress.

The following CBA criteria are used as a support to decision making:

a. benefit to cost ratio is ≥ 1: positive safety and business benefit established;

b. benefit to cost ratio is between 0.99 and 0.5: reasonable safety and business benefit established where costs are not grossly disproportionate against the safety benefit; and

c. benefit to cost ratio is between 0.49 and 0.0: weak safety and business benefit established.

64.8 Conclusion and Recommendation

64.8.1 The proposed increase in line speed makes the crossing non-compliant for sighting as a result closure of this crossing is supported as this removes the risk from the network

[16] Costs Supplied at a meeting held on 28th February 2021 between Network Rail & Kilborn Consulting

65 BWC/0.42 Red Row Bridge

65.1 This is a private crossing located to the north of Bedlington.

65.2 It was a crossing provided by the original railway company to enable the landowner to access his fields that were severed by the construction of the railway.

65.3 It carries only private rights in favour of the landowner which is now Northumberland County council.

65.4 The level crossing has not been used for a number of years as the Council and its tenant (if any) access the field to the south of the line by another route.

65.5 The crossing is recorded on Network Rail's ALCRM base as an M13 as it sees no usage.

65.6 Access to the level crossing on both approaches is overgrown.

66 BWC/0.64 Bomarsund User Worked Crossing

66.1 This is a private crossing which is located on the outskirts of the village of Bomarsund north of Bedlington.

66.2 It was a crossing provided by the original railway company as the railway severed an existing private vehicle road that also carried a public footpath.

66.3 The land served by the road and in which private rights exist is all owned by Northumberland County Council.

66.4 The vehicle gates have not been used for a number of years and on the east of the line (up side) west of the railway access by vehicles would be difficult due to overgrowth on the approach. Notwithstanding the lack of use by vehicles, as usage is possible, it is recorded in ALCRM as having a risk score of B10. Full gates (which are padlocked to prevent unauthorised usage) and decking are in situ at the crossing. the rights in the crossing vest in Northumberland County Council as landowner of the served land and through it any tenant.

66.5 Despite the crossing remaining operational it is understood that all access to the land served by it is via other means.

67 Witness declaration

I hereby declare as follows:

(i) This proof of evidence includes all facts which I regard as being relevant to the opinions that I have expressed, and that the Inquiry's attention has been drawn to any matter which would affect the validity of that opinion.

(ii) I believe the facts that I have stated in this proof of evidence are true and that the opinions expressed are correct.

(iii) I understand my duty to the Inquiry to help it with matters within my expertise and I have complied with that duty.

Name: Darren Lord

Signature:

Date: 11 October 2021